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Ways to improve the efficiency of the use of material and technical resources of medical institutions

Abstract

Object: The purpose of the study is to analyze the material and technical resources of medical institutions and to develop the ways to improve the efficiency of their use.

The objectives of the study are to develop the main directions and mechanisms for managing material and technical resources; to analyze the fixed assets of healthcare institutions; to assess the effectiveness of the material and technical resources management system.

The state of the healthcare system today is one of the most important areas of social development of the state, but it does not meet the needs of the population. The issue of improving the development of the sphere is relevant.

The article provides a review of the scientific literature on the topic of management and improvement of the use of material and technical resources of healthcare, analysis of the main indicators, namely the number of hospital organizations and the number of hospital beds, the main indicators of the condition and use of fixed assets in healthcare, the structure of fixed assets, SWOT analysis, etc. A regression analysis of the impact of health indicators on the change in gross domestic product was carried out. Correlation indicators are very high, which confirm the significance of the constructed model. Based on the above model, the forecast values of gross domestic product are calculated. And in the conclusion of the article, in order to improve the efficiency of the use of material resources, a mechanism for managing the material and technical resources of a medical institution is proposed. The mechanism of improving the use of material and technical resources consists of three stages, the use of which will lead to the effectiveness of their use.

Methods: The following research methods are used in the work: historical, statistical, structural and functional, system and comparative analysis.

Findings: The article considers and analyzes the use of fixed assets in healthcare institutions, the dynamics of the main indicators of the condition and use of fixed assets. Based on the analysis, strengths and weaknesses were identified, threats and opportunities of medical institutions were identified. In the age of digitalization, a special place is occupied by the material and technical base of medical institutions and their security, and therefore, for more efficient use of fixed assets, a mechanism for managing the material and technical resources of a medical institution is proposed.

Conclusions: The work emphasizes the need to provide material and technical resources, since the Concept of Healthcare development focuses on the development of digital healthcare, and in order to implement the program, a very good material base is needed. In this regard, in our opinion, the above mechanism for managing the material and technical resources of medical institutions will lead to optimization and efficiency of their use, improving the quality and efficiency of services provided.

Keywords: healthcare, material and technical resources, fixed assets, wear indicators, coefficient, digitalization, efficiency, mechanism.

Introduction

The year 2020 was a turning point, and the wave of COVID-19 morbidity became a challenge for all sectors of the economy and, first of all, for healthcare. The COVID-19 pandemic has changed our whole way of life and has shown that health is the greatest value. The main lesson that we have learned from the difficult epidemiological situation is that it is necessary to work on taking measures to strengthen the material and technical base and provide the healthcare system with personnel.

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The urgency of this problem is increasing every year, medical equipment is becoming obsolete, and therefore the object of research is the material and technical resources of healthcare. The availability of material and technical resources directly affects the efficiency and quality of the provided services.

Literature review

The decentralization of the health care system, which was carried out after the split of the Soviet Union, made it possible for the city and regional health departments to gain independence. Decentralization required careful preparation and reform was carried out over several years. In order to develop the healthcare industry, the state takes various measures to improve efficiency. Thus, 2002 was declared the Year of health and the state program for the development of healthcare was adopted. Since 2004, a new system has been introduced, which considered the consolidation of finances at the level of the regional department, and since 2010 they have been combined at the national level. In order to improve the quality of medical services, a Unified healthcare Information System was introduced in 2010. The state health program "Salamatty Kazakhstan" was approved from 2011 to 2015, according to the results of which the maternal and child mortality rates were reduced. From 2016 to 2019, the Densaulyk program was implemented and mandatory medical insurance was introduced in 2018.

Digitalization of healthcare is becoming relevant today, the Head of State also spoke about this in his speech. The President noted the importance of integrating the database in healthcare, in connection with which, within the framework of the state program "Information Kazakhstan 2020", the Concept of e-health development of the Republic of Kazakhstan for 2013-2020 was developed and approved. This concept is also supported in the state program "Densaulyk".

"The availability and quality of medical care largely depend not only on the amount of funding for medical organizations, but also on the quality of management of available resources. The issues of material and technical support of medical organizations are always in the field of view of the organizers of the healthcare system, since its level has a direct impact on the availability and quality of medical care" (Budarin S., 2020). "Today, resource provision is important for any business entity, since resources are not only a tool for achieving strategic goals, but also the potential of the organization. Healthcare institutions are no exception, the resource provision of their activities also plays a huge role" (Reprintseva E., 2016). "The technical equipment of medical activity is recognized by modern literature as one of the significant factors in improving the quality of medical care, along with the level of qualification of medical personnel" (Sharipov A. & Bryskina N., 2018).

Now many scientists pay special attention to innovative technologies and procedures of various healthcare processes, namely digitalization of processes. "Health policies encouraging enablers for developing and implementing innovations, contributing to the aims of health care systems, are clearly relevant in the context of digital health services. The WHO guide emphasis the different stages of the development of a digital health service, the need to involve different stakeholders in the development, monitoring, evaluation and implementation phases" (Ricciardi W. et al., 2019).

The World Health Organization (WHO) noted that digitalization of healthcare played a key role in the fight against COVID-19. "Digital health should be an integral part of health priorities and benefit people in a way that is ethical, safe, secure, reliable, equitable and sustainable. It should be developed with principles of transparency, accessibility, scalability, replicability, interoperability, privacy, security and confidentiality. Digital technologies are an essential component and an enabler of sustainable health systems and universal health coverage" (WHO, 2021).

So, in the article "An innovative procedure for introducing the lean concept into the internal drug supply chain of a hospital", the authors propose a methodology that takes into account both the technical approach and the actual behavior of the hospital, including knowledge in the field of logistics and motivation of the department staff to manage materials. "In recent years, several excellent technological solutions have been developed, but often their application on the ground has been limited and ineffective due to a lack of knowledge and commitment required and available to parish staff. The developed new methodology is aimed at eliminating this gap and was tested in an important case study" (Regattieri, A. et al., 2018).

Currently, digital technologies cover almost all areas of medicine. The use of information and communication technologies is shaping new models of healthcare development such as telemedicine, robotics, the Internet of Things, virtual and augmented reality technologies, etc. "Progress in Information and Communication Technologies (ICTs) is shaping more and more the healthcare domain. ICTs adoption provides new

opportunities, as well as discloses novel and unforeseen application scenarios" (Aceto G. & Antonio Pescapé A., 2018).

Also in the work of domestic scientists such as K.K. Kurakbayev, D.S. Isaev, M.K. Koshimbekov, A.E. Iglikova, etc. it is stated that "The technical and technological equipment of a healthcare organization can be considered as the main (basic) primary need. Rational medical technologies and standardization of technologies of the therapeutic and diagnostic process are becoming increasingly important, which leads to the quality management of medical care" (Kurakbayev K. et al., 2013).

Now various digital technologies are used in Kazakhstani clinics. For example, "Clinical and technological study of the possibility of combined use of CAD/CAM system, 3D printing and casting technology was conducted at the Department of Orthopedic Dentistry of S.D. Asfendiyarov KazNMU and on the basis of Daris TTE LLP in accordance with the Helsinki Declaration of GOST RK 52379-2005 "Good clinical Practice" (Altynbekov K. et al., 2018).

One of the main priorities for the introduction of digital technologies is the availability of a material and technical base and specialists who own IT technologies. The use and introduction of digital technologies will primarily affect the reduction of morbidity, the growth of life expectancy of the population, as well as the timely detection of pathology and prevention of morbidity. In this regard, the analysis of the state of the material and technical resources of healthcare institutions, and the development on its basis of directions for their effective use is significant and relevant. "The rapid introduction of digital technologies into various spheres of life of our society, observed over the past 10-15 years, has radically changed the reality around us. The world has become different, it has become "digital"" (Pavlova L. & Barbakov O., 2021).

Digital transformation, scientific approach, application of methods of comparison, comparison and postulates of evidence-based and personalized medicine allow you to choose and apply the best achievements from clinical medicine, as well as management and information theory (Stolyar V. & Kraynyukov P., 2021).

Methods

The following research methods are used in the work: historical, statistical, system and comparative analysis. Historical methods have made it possible to systematize, review and process information in the study of scientific works of scientists dealing with health issues, as well as regulatory legal acts in this area. Statistical methods made it possible to collect quantitative data and further measure them, identify patterns. Systematic and comparative analyses are methods of cognition that make it possible to consistently establish structural relationships between variables. All the research methods helped to systematize the collected material for its successful study.

Results

"One of the tasks in creating an effective system of medical care, the state sets strengthening the material and technical base of healthcare organizations. The solution to the problem of providing the population with high-tech medical care is directly related to the material and technical support of medical and preventive organizations. This will be facilitated by competent planning of the re-equipment and equipping of hospitals and polyclinics, health rehabilitation centers based on the development of equipment passports of these organizations, including medical equipment" (Kurakbayev K. et al., 2013).

"It should be noted that, from the standpoint of economic efficiency, it is material and technical resources that are the main types of resources used by healthcare institutions in the process of their economic activity" (Balokhina S. et al., 2009).

The state of material and technical resources is analyzed on the basis of an assessment of the basic fund, for this we will analyze the indicators of the state and use of fixed assets.

Figure 1 shows the dynamics of the number of hospital organizations, based on which it can be seen that their number has been decreasing since 2017, and in recent years of the analyzed period has increased by 24 units compared to the indicators of 2019.

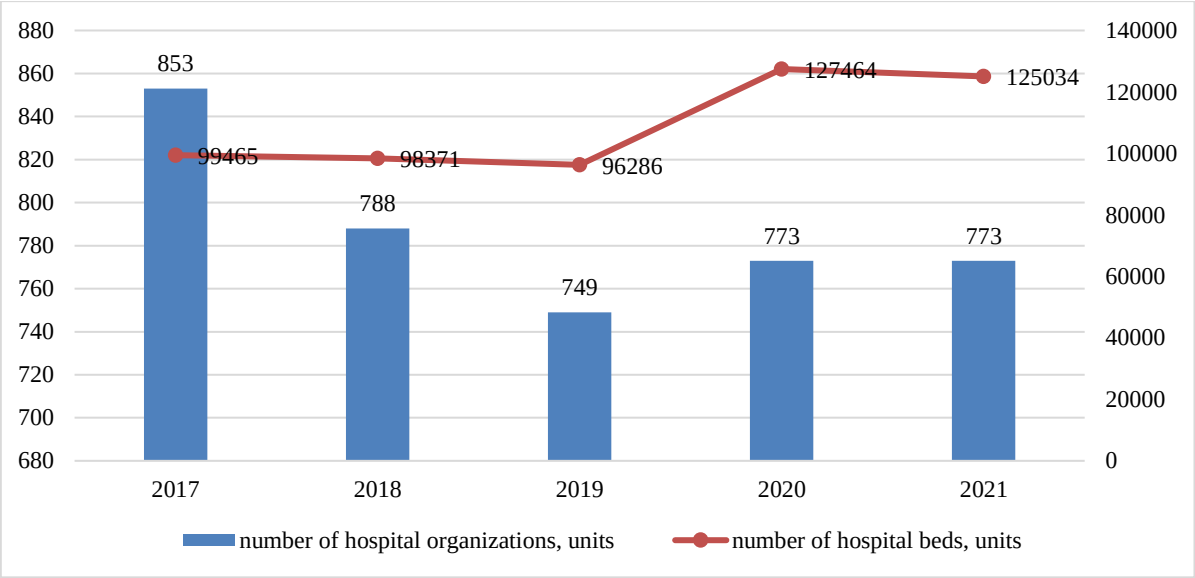

Figure 1. Dynamics of the number of hospital organizations and the number of hospital beds, units

Note – compiled by the authors on the basis of data from the Bureau of National Statistics, the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, https://stat.gov.kz/edition/publication/collection

The largest number of hospital beds is observed in 2020, this is due to the pandemic, with the introduction of new prefabricated hospitals. But since 2021, the bed fund has been reduced in a number of regions due to the closure of infectious departments due to a decrease in the number of patients undergoing inpatient treatment. According to the Bureau of National Statistics, the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, the main share of hospital organizations is concentrated in Almaty (91 or 11.77%) and Almaty (82 or 10.61%), Karaganda (75 or 9.7%) and East Kazakhstan regions (61 or 7.89%).

The largest number of beds is observed in 2020. In 2020, the number of beds increased by 32.4% or 31178. The analysis of the international experience recommended by Sanigest showed that the required number and minimum size of hospitals should be calculated based on the study of the results of the activities of hospitals aimed at the quality of provided services. The fundamental principles of this experience are timeliness, safety and quality. And the allocation of resources on an equitable basis is paramount. In this connection, the optimization of rural and reduction of the bed stock of urban hospitals is carried out. In addition, the number of hospitals that were additionally deployed during the coronavirus pandemic began to be reduced in the regions. Thus, 4 hospitals with 330 beds were closed in Nur-Sultan, 11 hospitals with about 2000 beds in Almaty.

The COVID-19 pandemic has become a stress test for all countries, which has revealed the main problematic areas in the development of healthcare in Kazakhstan. During this period, work has been carried out to support and restore the healthcare sector. The main problem faced by healthcare is the deterioration of medical equipment. Let's consider the main indicators of the state of fixed assets in the healthcare sector (Table 1).

Table 1. Dynamics of indicators of the use of fixed assets in healthcare institutions of Kazakhstan

Name of indicators	Years					Relative growth, % 2021/2017	Absolute increase
	2017	2018	2019	2020	2021		
Coefficient of renewal of fixed assets	8,6	7,9	7,8	11,6	14,5	68,6	5,9
The coefficient of liquidation of fixed assets	1,7	1,4	1,5	1,7	1,7	0,0	0
The degree of depreciation of fixed assets	36,8	42,2	41,9	37,4	37,8	2,7	1
Note – compiled by the authors on the basis of data from the Bureau of National Statistics, the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, https://stat.gov.kz/edition/publication/collection							

According to Table 1, it can be seen that there was a decrease in the renewal of fixed assets until 2020, this indicator has increased over the past year, medical equipment for coronavirus infection was purchased. Accordingly, the depreciation rate of fixed assets decreased. The increase in the update compared to the indicator of 2017 amounted to 68.6% or increased by 5.9 units.

The following Figures 2 and 3 show the structure and indicators of use by type of fixed assets. As we can see, the largest share falls on machinery and equipment (51.8%) and 39.4% are buildings.

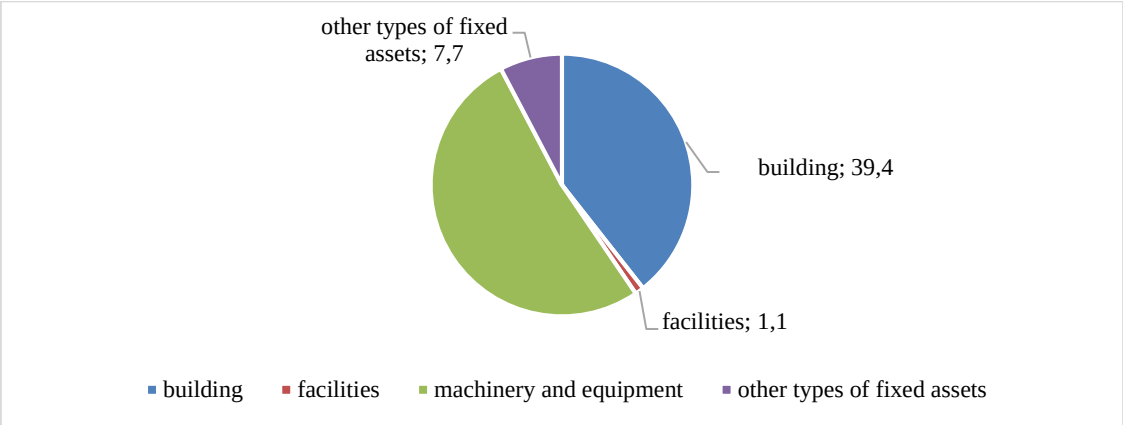

Figure 2. Structure of fixed assets by type for 2021, %

Note – compiled by the authors on the basis of data from the Bureau of National Statistics, the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, https://stat.gov.kz/edition/publication/collection

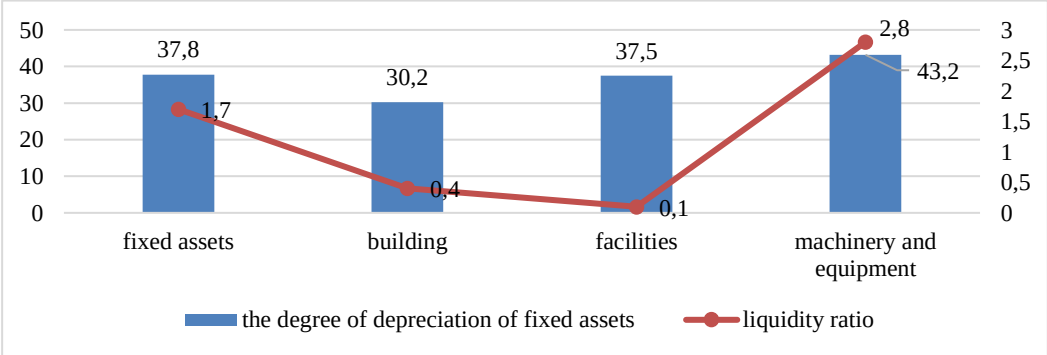

Figure 3. Indicators of the use of fixed assets by type for 2021, %

Note – compiled by the authors on the basis of data from the Bureau of National Statistics, the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, https://stat.gov.kz/edition/publication/collection

If we consider the indicators reflecting the technical condition of fixed assets, we can see that in general, the degree of depreciation of fixed assets is 37,8%, mainly depreciation is observed for machines and equipment (43,2%), respectively, the highest liquidity ratio is observed for this type of funds. In 2020, the renewal of fixed assets occurred due to the fact that 44 outpatient facilities were opened, 30 of which were opened in rural areas. During this year, 16 portable and prefabricated infectious diseases hospitals were built, 3 were reconstructed. 3,264 units of artificial lung ventilation devices were purchased. Domestic manufacturers have produced 1,500 units, 53 X-ray machines, 49 of which were purchased from domestic manufacturers. 1167 units of transport for emergency medical care were also purchased.

In 2021, in order to increase the effectiveness of product safety control, work was carried out to strengthen the material and technical base of laboratories, high-precision equipment was additionally purchased in a number of regions. The construction of 6 paramedic-obstetric, medical centers and outpatient clinics in rural areas has been completed, 17 healthcare facilities are under construction, 8 buildings are planned to be opened by lease. Also, the work of 2 medical trains “Zhardem” and “Salamatty Kazakhstan” was resumed, which provided medical care to 38 thousand residents in 10 regions. In addition, work has been carried out to update and equip district hospitals with modern CT scanners, X-ray machines, etc. To date, the equipment park of district hospitals has been brought to 84%. “Thus, material resources are one of

the main types of resources used by healthcare organizations in the course of their economic activities, and represent a set of fixed assets and working capital expressed in material form and used for the production of medical goods and services" (Reprintseva E., 2016).

In his Message dated September 01, 2020, the President of Kazakhstan K. Tokayev raised issues of the development of the healthcare system. In order to implement the Message, approaches to the organization, conduct of primary medical care, as well as the format of service provision have been revised. In addition, advisory services are being developed with the help of the national television network. To date, 259 medical organizations are connected to this network. Work is underway to complete the hardware and software part of the infrastructure, connection to the global network. To date, the availability of medical institutions to the Internet is 86.7%. In healthcare, medical information systems have been implemented that allow data to be transmitted to the Smart Data Ukimet analytical platform, and work is underway to integrate with the Ehealth core.

The dynamics of the population with oncological diseases is growing annually in Kazakhstan. In order to improve the quality of provided services, improve infrastructure, material and technical resources and personnel, various activities are carried out. In many cities, it is planned to build cancer centers, where advanced technologies and equipment will be purchased. In 2020, a corresponding center was opened in Aktau, the construction of a cancer center in Zhambyl region is being completed, a linear accelerator is installed in Ust-Kamenogorsk. Based on the analysis, the problematic aspects and opportunities of the healthcare sector in terms of material and technical development have been identified, which are summarized in Table 2.

Table 2. SWOT analysis of the state of the healthcare sector of the Republic of Kazakhstan

Strengths	**Weaknesses**
1. An extensive network of medical organizations providing primary health care; 2. Equipping medical organizations with medical equipment and sanitary transport; 3. Institutional structures have been formed to ensure the main functions of further development of digitalization; 4. Digitalization of healthcare; 5. The target architecture of the national level is being implemented; 6. Strategic partnership of medical universities with leading foreign universities; 7. Introduction of methods of assisted reproductive technologies, including in vitro fertilization (IVF); 8. Provision of healthcare infrastructure; 9. Restoration and construction of new health facilities; 10. Introduction of new medical technologies in the medical and diagnostic process; 11. Availability of telemedicine points in rural medical organizations.	1. Insufficient level of literacy of the population on health issues (the degree of influence of behavioral risk factors on health); 2. Aging infrastructure of medical organizations and insufficient equipment of medical equipment, especially in rural areas; 3. Heterogeneous level of service and quality of medical care; 4. Insufficient material and technical base of healthcare organizations, especially in rural areas; 5. Insufficient qualifications and experience of domestic software developers regarding the implementation of information systems that meet international standards; 6. Insufficient financing of the healthcare system; 7. Lack of digitalization of the sanitary and epidemiological service; 8. Imperfection of information technologies.
Opportunities	**Threats**
1. Exponential development of ICT in the healthcare sector, the emergence of affordable modern solutions on the market; 2. Knowledge and technology transfer through cooperation with international organizations and leaders of the ICT industry; 3. Introduction of innovative treatment methods and technologies, including in the field of biopharmaceuticals; 4. Public-private partnership in healthcare; 5. Increasing healthcare funding; 6. Development of technologies for rapid testing and diagnosis of diseases at early stages; 7. Development of telemedicine technologies and remote provision of medical services; 8. Introduction of artificial intelligence and full digitalization; 9. Mobile and web applications for informing and involving the population in protecting their own health.	1. Rise in prices for medical services /medicines / medical equipment; 2. Perception of IT security and data privacy risks by the community.
Note – compiled by the authors	

As can be seen from Table 2, the weaknesses are still the low equipment of the healthcare organization with equipment, insufficient qualifications of specialists in the field of information technology, insufficient financing of healthcare, etc.

Let's consider the indicators characterizing the healthcare sector of the Republic of Kazakhstan. The table below shows the availability of fixed assets in healthcare, expenses for the purchase of fixed assets and services rendered in the field of healthcare (Table 3). We will take these indicators as factors, that is, independent variables, and gross domestic product as a dependent one. We will conduct a correlation and regression analysis, identify the relationship and influence of factors on the gross domestic product.

Table 3. Dynamics of indicators for calculating correlation and regression analysis

Years	Gross domestic product, billion tenge	Availability of fixed assets in healthcare by balance sheet (net of depreciation) cost, million tenge	Services rendered in the field of healthcare, million tenge	Expenses for the purchase of fixed assets in the field of healthcare, million tenge
2017	54378,858	890 236	1 095 436,181	43 517,792
2018	61819,536	906 776	1168315,556	46 686,580
2019	69532,600	998 586	1339671,963	48 074,211
2020	70649,000	1 169 180	1 756 198,623	62 462,674
2021	83951,600	1 354 295	2 588 676,703	77 048,097
Note – compiled by the authors on the basis of data from the Bureau of National Statistics, the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, https://stat.gov.kz/edition/publication/collection				

According to the provided data, it is clear that all indicators are increasing in dynamics. To identify the relationship between the indicators, we will calculate the correlation (Table 4).

Table 4. Results of correlation analysis

	Column *1*	Column *2*	Column *3*	Column *4*
Column 1	1			
Column 2	0,938710727	1		
Column 3	0,933548783	0,985399584	1	
Column 4	0,916446074	0,990780472	0,990071839	1
Note – *compiled by the authors on the basis of statistical processing of information using the Regression analysis package in Excel*				

The table of correlation results shows a very high relationship between the indicators. Next, we will perform a regression analysis (Table 5).

Table 5. Regression analysis results

Regression statistics	
Multiple R	0,953983529
R-square	0,910084574
Normalized R-square	0,640338296
Standard error	6620,919953
Observations	5
Note – *compiled by the authors on the basis of statistical processing of information using the Regression analysis package in Excel*	

Also, the results of regression analysis confirmed the presence of a high relationship between dependent and independent variables, as well as factor values (Table 6, 7).

Table 6. Results of the analysis of variance

	df	*SS*	*MS*	*F*	*Significance of F*
Regression	3	443694679,5	147898226,5	3,373854051	0,375991
Remains	1	43836581,03	43836581,03		
Total	4	487531260,5			
Note – *compiled by the authors on the basis of statistical processing of information using the Regression analysis package in Excel*					

Table 7. Generated values of regression coefficients

	Coefficients	*Standard error*	*t-statistics*	*P-Value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Y-intersection	19197,43	56488,86	0,34	0,79	-698561,5	736956,4	-698561,5	736956,4
Variable X 1	0,08	0,13	0,63	0,64	-1,54	1,71	-1,54	1,71
Variable X 2	0,02	0,04	0,46	0,73	-0,48	0,52	-0,48	0,52
Variable X 3	-1,17	2,17	-0,54	0,68	-28,71	26,36	-28,71	26,36
Note – *compiled by the authors on the basis of statistical processing of information using the Regression analysis package in Excel*								

It can be seen from the analysis results that the constructed model is significant, since the correlation coefficient is 0.95 and the determination coefficient is 0.91. Regarding the regression coefficients, it can be seen that a change in the availability of fixed assets in healthcare at book value will lead to an increase in gross domestic product by 0.08 units, a change in the volume of services rendered in the field of healthcare will lead to an increase in GDP by 0.02 units and an increase in the cost of purchasing fixed assets will lead to a decrease in GDP by 1.17 units. The calculation and analysis of regression confirms that the cost of fixed assets directly depends on human capital and the gross domestic product depends on their health and ability to work. In order to maintain a healthy nation, it is necessary to create and develop a healthcare infrastructure and, first of all, to purchase and provide facilities and equipment to institutions, enterprises in the field of healthcare, to create comfortable conditions for receiving treatment to the population, etc.

Further, using the results of the regression analysis calculation, we calculated the forecast for 2022-2024 of the cost of fixed assets, on the basis of which it is clear that if funds are directed to the development of technology, accordingly, improve the healthcare sector, it will lead to an improvement in the health of the population, which will directly affect the development of the state (Fig. 4).

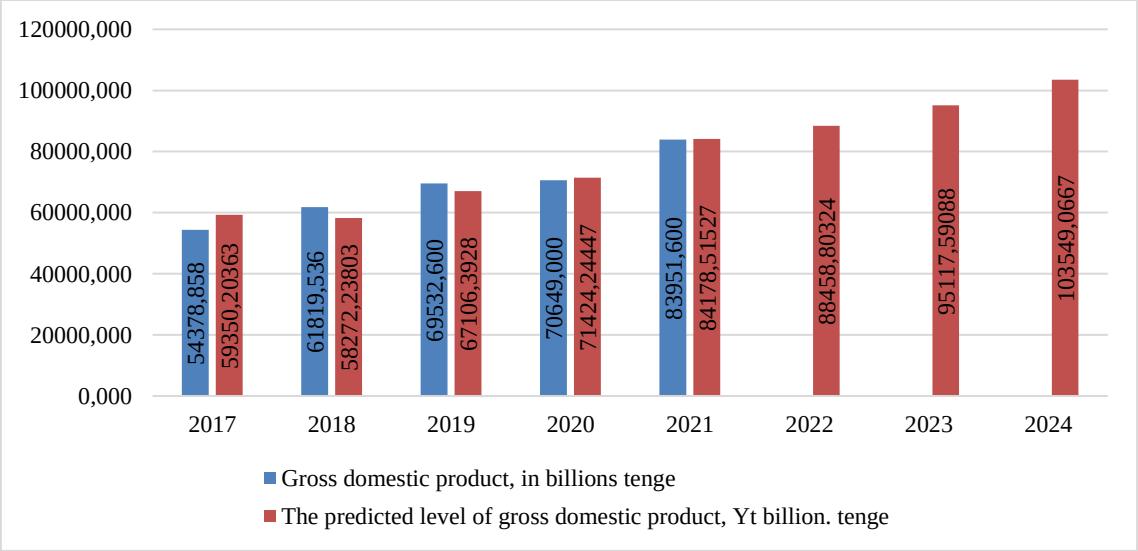

Figure 4. Calculation of the forecast value of the level of gross domestic product, billion tenge

Note – *compiled by the authors on the basis of statistical processing of information using the Forecasting package in Microsoft Excel*

Based on the calculation of the forecast values, it was revealed that the level of gross domestic product will grow and, accordingly, this will entail the need for fixed assets. As it is known, the degree of depreciation of fixed assets is about 40%, so the issue is acute in addition to the construction of new hospitals, equipping existing hospitals and diagnostic centers with equipment and components. Scientific and technological progress does not stand still, every day new high-tech equipment appears, which make it possible to improve the quality of service and, accordingly, to obtain effective diagnostics and treatment.

In many countries, leasing of medical equipment is used as one of the effective tools to solve the equipment of healthcare organizations, and in developed countries, existing equipment is being modernized. The advantages of these tools are that leasing allows the purchase of equipment on the basis of only a down payment, a guarantee for the period of operation and is economically beneficial for a medical organization. Modernization makes it possible to save time and money, in addition, it will make it possible to extend the life of the equipment. Moreover, now many companies that produce medical equipment include options in them that allow you to replace parts and elements with higher performance.

Discussions

Today, when Kazakhstan is moving to digitalization of healthcare, logistics is a top priority. An analysis of international experience has shown that digitalization is an effective direction for the development of medicine, as well as improving the quality of services. The effectiveness will be assessed in three areas — economy, social sphere and medical activity. The material and technical condition of healthcare does not meet today's requirements and trends of the time. The healthcare system needs to be reformed in the system of financing, logistics and management. The reform should be aimed primarily at improving the quality and efficiency of the industry. To do this, it is necessary to revise legislative and regulatory acts not only on material and technical support, but also pharmaceutical activities and the development of the medical industry. Special attention should be paid to the issues of state support, staffing, increasing capacity, attracting investment, etc. With the development of digitalization, the issue of research and development work is acute. Medical institutions need to work already in this direction, namely in the direction of the development of science. The development of science in the field of medicine will definitely lead to the use of modern innovative technology and technology, which requires trained qualified doctors and nursing staff.

In order to improve the efficiency of the use of material resources, we propose a mechanism for managing the material and technical resources of a medical institution, which is shown in Figure 5.

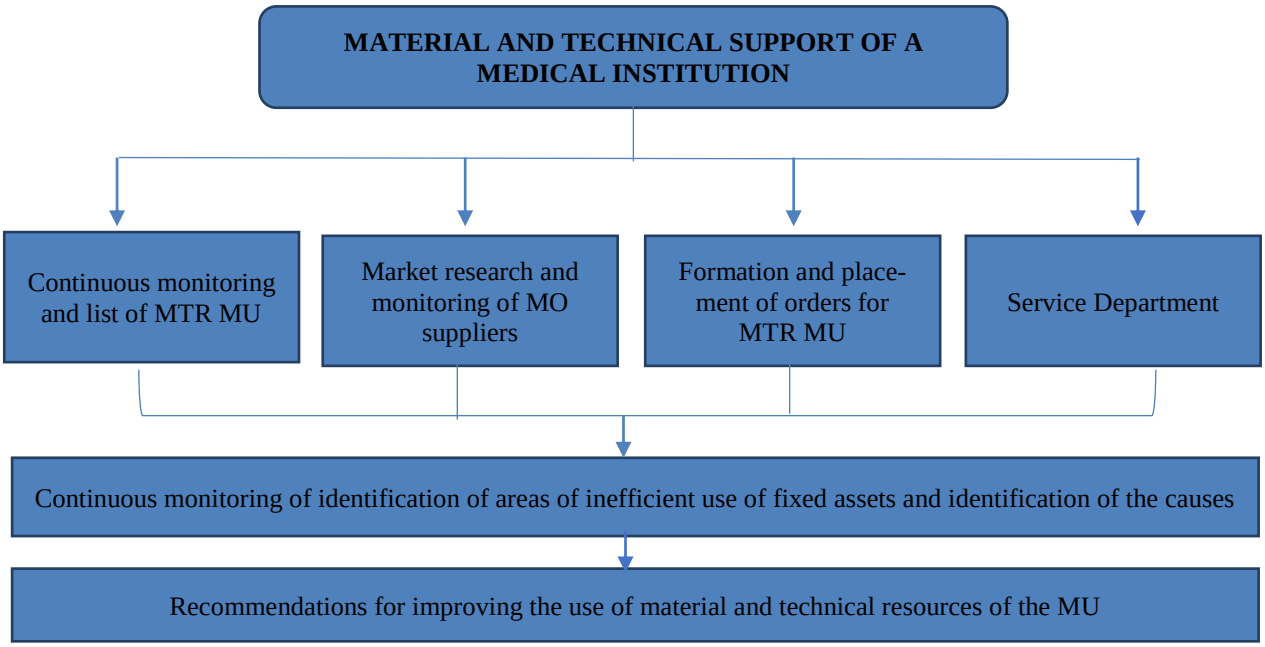

Figure 5. Mechanism of management of material and technical resources of medical institutions

Note – compiled by the authors

To manage the material and technical resources of a medical institution, it is necessary to: maintain a system of constant monitoring of the available material and technical equipment, their receipt and mainte-

nance, as well as the terms of operation; form an equipment purchase plan; study the market for medical industry products; service departments should be created at each medical institution for timely repair and maintenance of equipment; permanent monitoring of identification of areas of inefficient use of fixed assets and identification of the causes. Based on the monitoring, recommendations are being developed on the effectiveness of the use of material and technical resources of a medical institution.

Conclusions

"Healthcare, as with any other service operation, requires systematic innovation efforts to remain competitive, cost-efficient, and up-to-date. Day by day the cost of medical care is escalating at a distressing and indefensible rate worldwide" (Sakthivelmurugan E. et al., 2021). "Cost reductions brought about by digital health services also do not need to imply lower health care budgets, but simply the possibility to allocate the freed budget elsewhere" (Ricciardi W. et al., 2019). "Thus, improving the material and technical support of healthcare organizations in a market economy requires a comprehensive integrated approach to management" (Reprintseva E., 2017).

Based on the analysis and recommendations presented, their implementation, in our opinion, will contribute to the optimization and efficiency of the use of material and technical means of a medical institution, which will further lead to an increase in the availability and quality of medical care to the population.

Also, in order to manage and account for material and technical resources, it is necessary to introduce an information system for the republic to account for material resources. This system should keep records in the following areas:

1) information on concluded contracts for the purchase of equipment, machinery and technology, quantity of goods, unit price, total cost and terms of purchase;

2) information leading control over the supply of inventory;

3) information including the condition and service life of material and technical values in all medical institutions.

Thus, the provision of material and technical resources requires an integrated approach to their management, as well as strengthening the requirements for certification of software products of private developers in the field of healthcare.

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С.М. Ахтаева, Э.Б. Тлесова, Р. Шоқан, С.С. Ахметова, С.С. Шакеев

Медициналық мекемелердің материалдық-техникалық ресурстарын пайдалану тиімділігін арттыру жолдары

Аңдатпа

Мақсаты: Зерттеудің мақсаты — медициналық мекемелердің материалдық–техникалық ресурстарын талдау және оларды пайдалану тиімділігін арттыру жолдарын әзірлеу.

Зерттеудің міндеті — материалдық–техникалық ресурстарды басқарудың негізгі бағыттары мен тетіктерін әзірлеу; денсаулық сақтау мекемелерінің негізгі құралдарына талдау жүргізу; материалдық–техникалық ресурстарды басқару жүйесінің тиімділігін бағалау.

Денсаулық сақтау жүйесінің жай-күйі бүгінде мемлекеттің әлеуметтік дамуының маңызды бағыттарының бірі, бірақ халықтың қажеттіліктерін қанағаттандырмайды. Сондықтан саланы дамытуды жетілдіру мәселесі өзекті болып саналады.

Мақалада денсаулық сақтаудың материалдық–техникалық ресурстарын пайдалануды басқару және жетілдіру тақырыбы бойынша ғылыми әдебиеттерге шолу жасалған, негізгі көрсеткіштерге талдау жүргізілген, атап айтқанда, аурухана ұйымдары мен аурухана төсектерінің санына, денсаулық сақтаудағы негізгі құралдардың жай-күйі мен пайдаланылуының негізгі көрсеткіштеріне, негізгі қорлардың құрылымына, SWOT-талдауға және т.б. назар аударылған. Денсаулық сақтау көрсеткіштерінің жалпы ішкі өнімнің өзгеру әсеріне регрессиялық талдау жүргізілді. Корреляция көрсеткіштері өте жоғары, бұл салынған модельдің маңыздылығын растайды. Жоғарыда келтірілген модель негізінде жалпы ішкі өнімнің болжамды мәндері есептелді. Мақаланың қорытындысында материалдық ресурстарды пайдалануды жақсарту және оның тиімділігін арттыру мақсатында медициналық мекеменің материалдық-техникалық ресурстарын басқару тетігі ұсынылады. Материалдық-техникалық ресурстарды пайдалануды жақсарту тетігінің өзі үш кезеңнен тұрады, оларды пайдалану арқылы тиімділікті арттыруға болады.

Зерттеу әдістері: Жұмыста зерттеудің мына әдістері қолданылған: тарихи, статистикалық, құрылымдық-функционалдық, жүйелік және салыстырмалы талдау.

Қорытынды: Мақалада денсаулық сақтау мекемелерінде негізгі қорлардың пайдаланылуына, негізгі құралдардың жай-күйі мен пайдаланылуының негізгі көрсеткіштерінің серпініне талдау жасалып, қаралды. Талдау негізінде күшті және әлсіз жақтар қарастырылып, медициналық мекемелердің қауіптері мен мүмкіндіктері анықталды. Цифрландыру дәуірінде медициналық мекемелердің материалдық-техникалық базасы және олардың қамтамасыз етілуі ерекше орын алады, осыған байланысты негізгі құралдарды неғұрлым тиімді пайдалану үшін медициналық мекеменің материалдық–техникалық ресурстарын басқару тетігі ұсынылады.

Тұжырымдама: Мақалада материалдық–техникалық ресурстармен қамтамасыз ету қажеттілігі ерекше атап өтілген, өйткені денсаулық сақтауды дамыту тұжырымдамасы цифрлық денсаулық сақтауды дамытуға

басты назар аударады, ал бағдарламаны іске асыру үшін жоғары деңгейлі материалдық база қажет. Осыған байланысты, біздің ойымызша, медициналық мекемелердің материалдық-техникалық ресурстарын басқарудың жоғарыда аталған тетігі оларды пайдалану тиімділігі мен жалпы тиімділікті оңтайландыруға, көрсетілетін қызметтердің сапасын арттыруға әкеледі.

Кілт сөздер: денсаулық сақтау, материалдық-техникалық ресурстар, негізгі қорлар, тозу көрсеткіштері, коэффициент, цифрландыру, тиімділік, тетік.

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Пути повышения эффективности использования материально-технических ресурсов медицинских учреждений

Аннотация

Цель: Целью исследования является анализ материально-технических ресурсов медицинских учреждений и разработка путей по повышению эффективности их использования.

Задачи исследования — разработка основных направлений и механизмов управления материально-техническими ресурсами, проведение анализа основных средств учреждений здравоохранения, оценка эффективности системы управления материально-техническими ресурсами.

Состояние системы здравоохранения на сегодня является одним из важнейших направлений социального развития государства, но не удовлетворяющее потребности населения. Вопрос совершенствования развития данной сферы является актуальным.

В статье проведен обзор научной литературы по теме управления и совершенствования использования материально-технических ресурсов здравоохранения, проанализированы основные показатели, а именно число больничных организаций и число больничных коек, основные показатели состояния и использования основных средств в здравоохранении, структура основных фондов, представлен SWOT-анализ и т.д. Проведен регрессионный анализ влияния показателей здравоохранения на изменение валового внутреннего продукта. Показатели корреляции очень высоки, что подтверждает значимость построенной модели. На основе приведенной модели рассчитаны прогнозные значения валового внутреннего продукта. И в заключение статьи, в целях улучшения и эффективности использования материальных ресурсов, предлагается механизм управления материально-техническими ресурсами медицинского учреждения. Сам механизм улучшения использования материально-технических ресурсов состоит из трех этапов, использование которых приведет к эффективности их применения.

Методы исследования: В работе использованы следующие методы исследования: исторические, статистические, структурно-функциональный, системный и сравнительный анализ.

Результаты: Авторами рассмотрен и проведен анализ использования основных фондов в учреждениях здравоохранения, показана динамика основных показателей состояния и применения основных средств. На основании проведенного анализа выявлены сильные и слабые стороны, определены угрозы и возможности медицинских учреждений. В век цифровизации особое место занимают материально-техническая база медицинских учреждений и их обеспеченность, в связи с чем для более эффективного использования основных средств предлагается механизм управления материально-техническими ресурсами медицинского учреждения.

Выводы: В работе особо подчеркивается необходимость обеспечения материально-техническими ресурсами, так как Концепция развития здравоохранения основной упор делает на развитие цифрового здравоохранения, а для того, чтобы реализовать программу, нужна очень хорошая материальная база. В связи с этим, на наш взгляд, приведенный механизм управления материально-техническими ресурсами медицинских учреждений приведет к оптимизации и эффективности их использования, повышению качества и оперативности оказываемых услуг.

Ключевые слова: здравоохранение, материально-технические ресурсы, основные фонды, показатели износа, коэффициент, цифровизация, эффективность, механизм.

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