

Assessment of technical equipment supply in healthcare institutions: example of Almaty

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Background: The share of healthcare-related expenditure in the Gross Domestic Product of Kazakhstan is relatively small, and it is strategically important to restructure budgetary expenses in favor of healthcare with simultaneous redistribution of resources in accordance with changing demands and prioritization of high-quality medical care. The aim of this study was to analyze resource provision to healthcare organizations in Kazakhstan and its structure and level assessment. **Materials and Methods:** The study is based on a comparative assessment of technical and technological equipment of medical institutions in Almaty, Kazakhstan. We analyzed the scope and structure of the financial component of the resource base in Almaty. We carried out information processing and analysis methods, content analysis, mathematical treatment, as well as conducted case studies. Also, we held opinion poll among medical staff (specialists, managerial staff) ($n = 300$) P for trend < 0.001 and patients ($n = 210$) P for trend < 0.001 . **Results:** About 18.8% of patients do not receive medical care because of defects of the equipment, whereas 19.9% of patients claim that the reason of refusal of the provision of medical services is an equipment overload. **Conclusion:** Most of the respondents referred to on poor technical equipment, mismatch with the world standards of performance and competitiveness. Lack of advanced medical technology, inadequate financing, insufficient supply of domestic medical equipment, and inadequate procurement by tender were also noted. The obtained data point to the need for optimization and upgrading medical equipment at various levels of healthcare.

Key words: Assessment, healthcare institutions, Kazakhstan, technical equipment supply

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INTRODUCTION

The current share of healthcare-related expenditure in the gross domestic product of Kazakhstan is roughly 3.2%.^[1] There is a tendency of restructuring budgetary expenses on health care, with redistribution being planned in accordance of the changing health priorities and the need of rendering high-quality medical care.^[2]

The technical equipment supply in healthcare institutions was developed, aimed at evaluation of the rate of achievement of final results of the health care system. The system enables to assess the effectiveness of health care system; measure the results of health care reforming and development; predict the medical-social effect under the managerial decision making; justify the strategic directions of the field development; conduct ranking score of health care organizations.

One of the main directions of healthcare policy in Kazakhstan is the creation of favorable conditions for equipping healthcare facilities with modern diagnostic and curative equipment. This will allow more effective functioning of the medical equipment

market. Several studies have shown that this market is a steadily developing part of the economic complex of the country, which is still in transition to new economic relations. Kazakhstan has already adopted new forms of private ownership and competition, increased the number of enterprises, their volume and product mix.^[2]

A study of features of medical equipment market in Kazakhstan reveals the development of integration processes, specialization, and tough competition between enterprises, firms, and companies.^[2] A characteristic feature of the modern Kazakh market is the presence of foreign capital and increasing volumes of imported products. Current volumes of sales of imported medical devices outweigh local sales (65% vs. 35%).^[3]

An important factor in the development of medical equipment market is the impact of the external (financial and technical) environment. Our study of the environment focused on the three areas: Analysis of consumers of medical equipment and instruments, competition, and system sales.

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MATERIALS AND METHODS

This study was performed in Almaty — the largest city and the former capital of Kazakhstan. In spite of the fact that the capital of Kazakhstan moved to Astana in 1997, Almaty remains the developed city in the country with the highest technical equipment supply.

We have analyzed the scope and structure of the financial component of the resource base in Almaty. We employed information processing and analysis methods, content analysis, mathematical treatment, and a case study. The sociological analysis of opinions of medical staff from 7 hospitals' specialists ($n = 203$), managers ($n = 97$), and patients ($n = 200$) about the technical equipment supply in healthcare institutions was also carried out.

RESULTS

In absolute terms, the amount of target costs for medical equipment for 2005–2008 showed a positive incremental trend. However, the share of the available funds decreased from 9.9% in 2005 to 6.3% in 2008 [Chart 1]. The chart also indicates allocated funds in mln Tenge.

There is also a negative attitude to the real technical equipment of the medical organizations (MO) by the majority of surveyed administrators (heads) (62.8% odds ratio [OR] = 1.9, 95% confidence interval [CI]: 1.2–3.1) and specialists (58.4% OR = 1.6, 95% CI: 1.2–2.1) 32.9% (OR = 2.3, 95% CI: 1.5–3.7) of heads and 38.1% (OR = 1.4, 95% CI: 1.1–1.9) of specialists do not support this opinion [Chart 2].

At the same time, 18.8% of patients did not receive medical care because of defects of the equipment, while 19.9% of patients claimed that the reason of refusal to render medical services is an equipment overload.^[4]

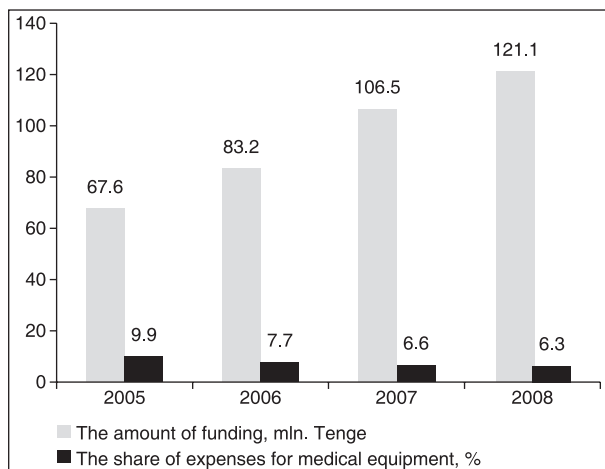


Chart 1: Dynamic of the financing of the healthcare system and the share of expenses for medical equipment in Almaty for 2005–2008

About 3.6% of the respondents wanted to have improved equipment conditions of healthcare organizations, which should meet global standards. The equipment should be preferably portable, operating on both network and stand-by modes (battery), have light weight, and should be the product of the recent achievements in medical technologies and advanced methods of diagnosis and treatment.^[5]

The reasons for dissatisfaction of respondents with the available technical equipment of their healthcare organizations are associated with inadequate organization and financing of medical equipment supply.^[6] The main reasons for dissatisfaction are presented in Chart 3. It shows that 58.4% (A) - of respondents referred to poor technical equipment, mismatch with the world standards of performance and competitiveness. 20% (B) - a lack of advanced medical technology, computerization. 8.4% (C) - lack of financing. 4.2% (D) - insufficient supply of domestic medical equipment. 3.2% (E) - inadequate procurement by tender, untimely provision of medical equipment. 1.6% (F) - a lack of qualified staff supply. 1.6% (G) - lack of required drugs in the lists of essential drugs and inappropriate technical equipment to the standards of diagnosis and treatment; 1.6% - the presence of an unnecessary intermediary between manufacturers and health organizations, poor staff management at the level of Health Monitoring and the Ministry; 1% - an overburdened X-ray and fluorography devices.

The issue is especially relevant to the analysis of satisfaction level with technical equipment in separate units of MO. During the survey, 1.4% of head of MO and 4.8% of head of departments emphasized the lack of trained professionals, who can properly use the available advanced technical equipment. As a result, the equipment is not used at full capacity. In an attempt to increase the efficiency of medical care 4.3% of head of MO and 1% of head of departments

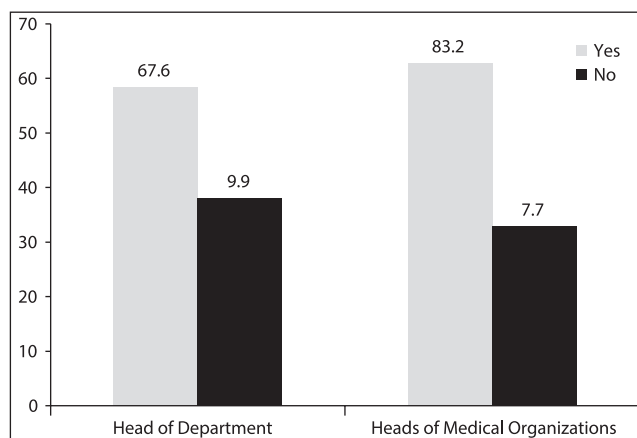


Chart 2: Degree of satisfaction with level of technical equipment of medical institutions ($n = 300$)

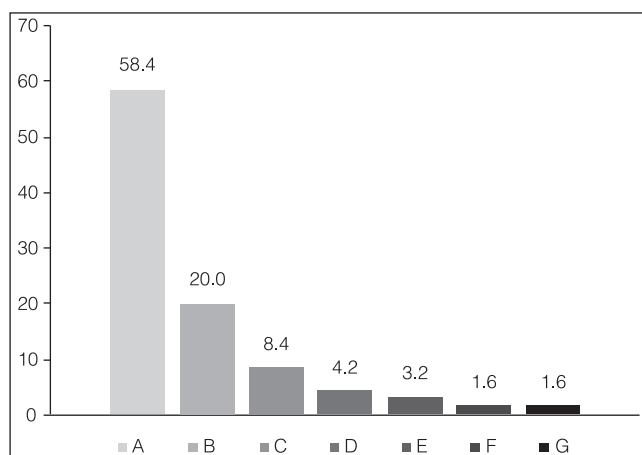


Chart 3: Reasons for dissatisfaction of surveyed patients ($n = 210$) with technical equipment of their healthcare organizations (P for trend < 0.001) (A - poor technical equipment, mismatch with the world standards of performance and competitiveness; B - lack of advanced medical technology, computerization; C - lack of financing; D - insufficient supply of domestic medical equipment; E - inadequate procurement by tender, untimely provision of medical equipment; F - lack of qualified staff supply; G - lack of required drugs in the lists of essential drugs and inappropriate technical equipment to the standards of diagnosis and treatment)

point to the need for abolishing centralized procurements by tender and for embarking on independent procurement of necessary technical equipment.^[7]

111 (36.9%) respondents agreed that the technical equipment of their MO does not meet the requirements of international protocols for diagnosis and treatment, whereas 155 (51.8%) disagreed, and 34 (1.3%) did not answer.

DISCUSSION

There is a significant discrepancy between the existing medical equipment and established technical and economic parameters, and lack of adherence to the standards of different health care services endorsed by the Ministry of Health of Kazakhstan. Volume and type of guaranteed free medical care to the population of the city also remain unmet.^[8] Based on the analyses, priority directions of the development of the healthcare system of the city, required resources and reserves to achieve the expected health care results are determined.

We comprehensively evaluated technical and technological support for healthcare organizations and their compliance with the available standards. Successful development of the industry requires the enhancement of the armamentarium of MO, with improving technical level of diagnostic and treatment processes and the use of medical equipment.^[8]

Based on the anonymous survey, there are certain shortcomings of the current systems of equipment provision

in the following areas: cardiology, surgery, ophthalmology, gynecology, endoscopy, X-ray and fluorography, laboratory, ENT, anesthesia, resuscitation, artificial respiration, hemodialysis and chemisorption, neurophysiology, clinical diagnostic laboratory, physiotherapy, ultrasound scanning. There are no target provision programs, and the regulations policies and standards relating to medical equipment are not in accordance with international standards.^[8]

CONCLUSION

Thirty percent of heads of MO and 14 (14%) of heads of departments associate inadequate level of equipment with insufficient funding allocated for the purchase of modern medical equipment. 3 (2.8%) of heads report low efficiency of centralized provision through the healthcare departments and absence of self-regulated purchase of essential medical equipment in accordance with the emerging needs of individual healthcare organizations.

We found discrepancies of technical equipment of health care organizations are the reserve in the management of their activities, which will help to improve the quality of care provided to different groups of the population of the city.

AUTHORS' CONTRIBUTIONS

All authors participated in designing the study. KKK carried out the design and coordinated the study, contributed in elaboration of the work concept, took part in approval of the final version of the manuscript. DSI participated in data collection during most of the experiments and prepared the manuscript. MKK assisted in designing the study, coordinated and carried out all experiments and participated in manuscript preparation. ABK assisted during all experiments, contributed in the drafting and revising the draft, took part in approval of the final version of the manuscript. All authors have read and approved the content of the manuscript and agreed with all aspects of the work.

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