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LEAN TECHNOLOGIES AS AN INTEGRAL PART OF MEASURES TO IMPROVE THE QUALITY OF MEDICAL CARE ON THE EXAMPLE OF A DENTAL CLINIC

***Yu.N. Belyaeva¹, M.A. Polidanov^{2*}, Ye.M. Shebalova¹, G.V. Gubanova¹, A. Yu. Yurishcheva²,
S.-M.S. Isaev¹, U.R. Batukaev¹, A.N. Abumislomov¹, A.A. Chernova¹, T.A. Shipkova¹,
D.S. Alishikhova¹, A.B. Lupanova¹***

¹*Saratov State Medical University named after V.I. Razumovsky,*

²*University "Reaviz", Saint Petersburg, Russian Federation*

БЕРЕЖЛИВЫЕ ТЕХНОЛОГИИ КАК СОСТАВНАЯ ЧАСТЬ МЕРОПРИЯТИЙ ПО УЛУЧШЕНИЮ КАЧЕСТВА МЕДИЦИНСКОЙ ПОМОЩИ НА ПРИМЕРЕ СТОМАТОЛОГИЧЕСКОЙ КЛИНИКИ

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e-mail: maksim.polidanoff@yandex.ru

[Belyaeva Yu.N. – Assistant of the Department of Polyclinic Therapy, General Medical Practice and Preventive Medicine, Head of the Center for the Development of Lean Technologies in Healthcare, ORCID: 0000-0001-8893-1907; Polidanov M.A. (*contact person) – Advisor to the Russian Academy of Natural Sciences (RANS), Research Department Specialist, Assistant of the Department of Biomedical Disciplines, ORCID: 0000-0001-7538-7412; Shebalova Ye.M. – lecturer of the Department of Polyclinic Therapy, General Medical Practice and Preventive Medicine, Methodologist of the Center for the Development of Lean Technologies in Healthcare, ORCID: 0000-0003-2832-1044; Gubanova G.V. – PhD (Medicine), Associate Professor of the Department of Polyclinic Therapy, General Medical Practice and Preventive Medicine, ORCID: 0000-0001-8268-9785; Yurishcheva A.Yu. – 2nd-year Student of the Dental Faculty, ORCID: 0009-0002-3486-2525; Isaev S.-M. S. – 5th-year Student of the Dental Faculty, ORCID: 0009-0009-6479-881X; Batukaev U.R. – 5th-year Student of the Dental Faculty ORCID: 0009-0001-7707-4134; Abumislomov A.N. – 6th-year Student of the Medical Faculty, ORCID: 0009-0003-9315-5721; Chernova A.A. – 6th-year Student of the Pediatric Faculty, ORCID: 0009-0005-6298-0117; Shipkova T.A. – 6th-year Student of the Pediatric Faculty, ORCID: 0009-0004-1529-0837; Alishikhova D.S. – 6th-year Student of the Pediatric Faculty, ORCID: 0009-0004-0975-085X; Lupanova A.B. – 6th-year Student of the Pediatric Faculty, ORCID: 0009-0008-6082-1624].

Ю.Н. Беляева¹, М.А. Полиданов^{2*}, Е.М. Шебалова¹, Г.В. Губанова¹, А.Ю. Юрищева², С.-М.С. Исаев¹, У.Р. Батукаев¹, А.Н. Абумислимов¹, А.А. Чернова¹, Т.А. Шипкова¹, Д.С. Алишихова¹, А.Б. Лупанова¹

¹Саратовский государственный медицинский университет имени В.И. Разумовского,

²Университет «Реавиз», г. Санкт-Петербург, Российская Федерация

Objective. To assess the opportunities and efficiency of integration of lean production tools and methods into the practical activities of primary and specialized medical care on the example of multidisciplinary dental clinic «Dental-Lux» LLC, Saratov

Materials and methods. This study included the following stages: primary data collection by anonymous sociological survey using telecommunication devices (a phone or a tablet), placing the questionnaire on the clinic's website and at the reception desk; analyzing the data and making suggestions for improving the activity on the basis of these data; elimination of the shortcomings detected in the survey and implementation of the improvements into the daily practice; repeated patient survey (using the same method and the same questionnaire) with an assessment of patients' satisfaction with the quality of dental care in Saratov. The authors conducted a survey of 128 residents of Saratov who receive dental care in the multidisciplinary dental clinic "Dental-Lux" LLC, Saratov ("Dental-Lux" LLC). A specially designed questionnaire included questions about the respondents, as well as a block of questions concerning patients' satisfaction with the process and quality of dental care at "Dental-Lux" LLC. For mathematical processing, the results of the study were initially entered into an electronic database; the analysis of the study results was carried out using the method of descriptive statistics.

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e-mail: maksim.polidanoff@yandex.ru

[Беляева Ю.Н. – руководитель центра по развитию бережливых технологий в здравоохранении, ассистент кафедры поликлинической терапии, общей врачебной практики и профилактической медицины, ORCID: 0000-0001-8893-1907; Полиданов М.А. (*контактное лицо) – советник Российской академии естествознания (РАЕ), специалист научно-исследовательского отдела, ассистент кафедры медико-биологических дисциплин, ORCID: 0000-0001-7538-7412; Шебалова Е.М. – методист центра по развитию бережливых технологий в здравоохранении, преподаватель кафедры поликлинической терапии, общей врачебной практики и профилактической медицины, ORCID: 0000-0003-2832-1044; Губанова Г.В. – кандидат медицинских наук, доцент кафедры поликлинической терапии, общей врачебной практики и профилактической медицины, ORCID: 0000-0001-8268-9785; Юрищева А.Ю. – студент II курса стоматологического факультета, ORCID: 0009-0002-3486-2525; Исаев С.-М.С. – студент V курса стоматологического факультета, ORCID: 0009-0009-6479-881X; Батукаев У.Р. – студент V курса стоматологического факультета, ORCID: 0009-0001-7707-4134; Абумислимов А.Н. – студент VI курса лечебного факультета, ORCID: 0009-0003-9315-5721; Чернова А.А. – студент VI курса педиатрического факультета, ORCID: 0009-0005-6298-0117; Шипкова Т.А. – студент VI курса педиатрического факультета, ORCID: 0009-0004-1529-0837; Алишихова Д.С. – студент VI курса педиатрического факультета, ORCID: 0009-0004-0975-085X; Лупанова А.Б. – студент VI курса педиатрического факультета, ORCID: 0009-0008-6082-1624].

Results. While carrying out the study, it was found out that the majority of the respondents were satisfied with the quality of dental care provided on an outpatient basis. This indicates the focus of the organization of specialized dental care in “Dental-Lux” LLC on the patients’ requirements and the desire to meet their needs. The research has shown that inefficient organization of the registration office work and making an appointment to the doctor contributed to the low degree of patients’ satisfaction significantly. The authors believe that, in order to solve the problem, it is necessary to optimize the work of the registration desk by introducing modern technologies and ensuring uniform distribution of responsibilities among the employees.

Conclusions. While conducting the study it was determined that the organization of medical care, including the non-state healthcare institutions, requires continuous improvements and changes. Identifying problem areas and working on them are key aspects in the improvement of treatment and diagnostic process organization. It is important to address each of the above factors individually in order to increase the level of patients’ satisfaction. A continuous internal audit and further correction of the identified problems in any medical organization will raise the level of satisfaction with medical care among the population.

Keywords. Lean technologies in healthcare, lean polyclinic, multidisciplinary dental clinic, dental care, quality of medical care, implementation of new technologies.

Цель. Оценка возможностей и эффективности интеграции инструментов и методов бережливого производства в практическую деятельность звена первичной и специализированной медицинской помощи на примере многопрофильной стоматологической клиники ООО «Денталь-Люкс», г. Саратов.

Материалы и методы. Настоящее исследование включало в себя следующие этапы: первичный сбор данных путем анонимного социологического опроса с использованием телекоммуникационных устройств (телефон или планшет), размещение анкеты на сайте клиники и на стойке регистратуры; проведение анализа данных и на их основе формирование предложений по улучшению деятельности; устранение выявленных при анкетировании недостатков и внедрение в повседневную практику улучшений; повторный опрос пациентов (тем же методом и по той же анкете) с оценкой удовлетворенности пациентов качеством оказания медицинской помощи. Авторами был проведен опрос 128 жителей г. Саратова, получающих стоматологическую помощь в многопрофильной стоматологической клинике ООО «Денталь-Люкс» (ООО «Денталь-Люкс»). Специально разработанная анкета включала в себя указанные сведения о респонденте, а также блок вопросов об удовлетворенности пациентов о процессе и качестве оказания стоматологической помощи в ООО «Денталь-Люкс». Для математической обработки результаты исследования изначально заносили в электронную базу данных; анализ проводился с использованием метода описательной статистики.

Результаты. В ходе проведения исследования было установлено, что большинство анкетированных выразили удовлетворение качеством оказания медицинской стоматологической помощи, предоставляемой в амбулаторных условиях, что свидетельствует о фокусе организации специализированной стоматологической медицинской помощи в ООО «Денталь-Люкс» на потребностях пациентов и стремлении к удовлетворению их запросов. Исследования показали, что в низкую степень удовлетворенности пациентов значительный вклад внесла неэффективная организация работы регистратуры и записи на прием к врачу. По мнению авторов, для решения проблемы необходимо оптимизировать работу регистратуры путем внедрения современных технологий и обеспечения равномерного распределения обязанностей среди сотрудников.

Выводы. В ходе исследования установлено, что организация оказания медицинской помощи, в том числе в учреждениях сектора негосударственного здравоохранения, требует постоянных улучшений и изменений. Выявление проблемных областей и работа над ними – ключевой аспект улучшения организации лечебно-диагностического процесса. Важно индивидуально подходить к каждому из вышеупомянутых факторов с целью повышения уровня удовлетворенности пациентов. Проведение постоянного

внутреннего аудита в любой медицинской организации и последующая корректировка выявленных проблем позволят повысить уровень удовлетворенности населения медицинской помощью.

Ключевые слова. Бережливые технологии в здравоохранении, бережливая поликлиника, многопрофильная стоматологическая клиника, стоматологическая помощь, качество оказания медицинской помощи, внедрение новых технологий.

INTRODUCTION

The population's need for primary, including pre-medical, medical and specialized medical and sanitary care for dental diseases increases every year. Recently, the working conditions of dentists have changed significantly, because dentistry is developing rapidly and is one of the branches of healthcare that actively introduces new equipment, drugs, high-tech techniques and artificial intelligence [1; 2]. Despite this, a personnel shortage remains in this sphere, as well as incomplete equipment of the material and technical base in medical organizations that provide dental care in outpatient settings. These circumstances lead to compensatory development of the non-governmental health care sector, with private dentistry developing most actively. But even in these structures, over time, organizational problems arise that require monitoring and enhancement in order to improve the quality of medical care and attract patients. The quality of medical care is one of the key indicators of the success of the healthcare system in the modern world. The main aspects of evaluation are accessibility, efficiency, safety and patient-centeredness [3]. When organizing work, it is necessary to take into account the population's intent for paid medical services

and the triggers for patients' decision-making when choosing a private or state (municipal) medical institution [5]. It has been established that the majority of people who actively applying to paid medical services have an average income or an income above average [5; 6]. Such patients, as a rule, have high demands on medical services, and the main factor that attracts them to the private health care system is the availability and quality of medical care. Problems of interaction in the “doctor-patient” relationship have been at the fore in primary health care recently. Numerous studies have shown the importance of the communication skills of the doctor and staff in creating an atmosphere focused on psychological comfort in a medical institution [6], especially in dental. Medical institutions provide training in social interaction skills for future doctors [7], nurses [8], first contact specialists – administrators of medical clinics, registry workers. Lean technologies play an important role in improving the efficiency and quality of medical care in outpatient settings. In particular, the experience of lean production is undoubtedly relevant as a mechanism for improving the processes taking place in clinics and increasing patient satisfaction with the provision of medical care [9]. The use of lean technologies in a dental clinic includes quick and

convenient registration with the required specialist, consultation on all issues, as well as the use of modern electronic databases for the accumulation and safe storage of patient information [10; 11]. The dental clinic will be able to increase patient satisfaction and become a serious competitor in the medical services market due to using lean technologies [12].

The purpose of the study is to assess the possibilities and effectiveness of integrating lean manufacturing tools and methods into the practical activities of primary and specialized medical care using the example of the multidisciplinary dental clinic "Dental-Lux" LCC, Saratov.

MATERIALS AND METHODS

This study included the following stages: primary data collection through an anonymous sociological survey using telecommunication devices (phone or tablet), posting a questionnaire on the clinic's website and at the reception desk; conducting data analysis and, based on this, formulating proposals for improving activities; eliminating the shortcomings identified during the questionnaire survey and introducing improvements into everyday practice; a repeated survey of patients (using the same method and the same questionnaire) with an assessment of patient satisfaction with the quality of medical care. The authors conducted a survey of 128 residents of Saratov receiving dental care at the multidisciplinary dental clinic "Dental-Lux" LCC. A specially developed questionnaire included information about the respondent, as well as a block of

questions about patient satisfaction with the process and quality of dental care at "Dental-Lux" LCC.

The results of the study were initially recorded into an electronic database for mathematical processing; the analysis of the results was carried out using the method of descriptive statistics.

RESULTS AND DISCUSSION

When studying the data revealed by questioning patients receiving dental care at "Dental-Lux" LCC, it was found that the main group of respondents were females (66.4 %). At the same time, among the respondents of middle age (45–59 years old) there was a prevailing majority – 42.6 %, at the age of 18–44 years – 36.3 %. This is explained by the specificity of the contingent receiving treatment at a private dental clinic. 87 % of those surveyed permanently reside in Saratov and/or the Saratov region.

One of the main aspects that served as the goal of our scientific work is to find out the health status of citizens and the reasons for providing them with dental care. To the question "How do you rate your dental health?" more than half of the respondents (52.3 %) answered that they consider their health "ordinary for most people." While those who rated their health "above average" turned out to be 33.2 %, and "below average" – 14.5 %. It is noteworthy that none of the respondents rated their health as "bad" or "very good.". Patients visited the clinic to receive therapeutic dental (58.9 %), orthopedic (26.4 %), surgical

(9.2 %) care and for other reasons (5.5 %), such as preventive examination, physiotherapy, CT diagnostics. The most common reasons for visiting dentists were acute toothache (35.6 %), bad breath (24.3 %), increased tooth sensitivity (18.3 %), bleeding gums (12.6 %), food stuck between teeth (4.4 %), chipped teeth (2.5 %) and others (2.3 %). When assessing the results of the first stage of the study, it was found that the overwhelming majority of respondents (57.0 %) were satisfied with the work of the reception. At the same time, half (48.2 %) of respondents said that they were satisfied with the duration of the wait for an appointment with a dentist. But some noted that they had to spend some time calling the reception desk to make an appointment with a doctor (3.7 %). Also, a significant proportion of respondents were completely satisfied with the professional qualities and attentive attitude towards patients on the part of dentists (74.6 %) and nurses (76.2 %), and only 0.9 % of respondents considered the attention from the doctor and medical staff to be insufficient. When assessing the work of the mid-level medical staff of the polyclinic in performing diagnostic and treatment procedures, the highest score was given by 83.6 % of the surveyed patients. It should also be noted that 78.4 % of respondents are completely satisfied with the design of the premises, but 15.1 % noted the insufficient number and convenience of waiting areas for visitors.

Thus, the majority of respondents were satisfied with the work of this medical institution, only a third of respondents (31.1 %)

considered it important and necessary to leave their wishes and suggestions for improving the organization of work in “Dental-Lux” LCC. Among the most popular were: notify about the doctor’s appointment in the morning or at least the day before the appointment, change the procedure for making an appointment at the reception, increase the number of doctors so that there are no long waiting lines, and also introduce a Wi-Fi network accessible to patients.

The obtained survey data was analyzed by specialists of the educational and methodological center for the development of lean technologies in healthcare of the Federal State Budgetary Educational Institution of Higher Education “Saratov State Medical University named after V.I. Razumovsky” of the Ministry of Health of the Russian Federation (EMC LT SSMU), proposals for improvement were formulated, a briefing was held with the management of the clinic, work was carried out to improve the provision of medical services. As a result, the number of reception staff has been increased, a call center with a PBX phone drop extension has been organized to speed up the time of registration at the clinic and calling patients; lean production methods (such as 5C, visualization, kaizen and others) have been introduced into the daily activities of the front office; practical classes have been held with the administration, dentists, medical personnel, reception and call center specialists on the topic of “The Importance of First Contact: Psychology of Communication with the Patient” at the EMC LT SSMU process factory. A decision

was made to continuously assess satisfaction with the quality of medical care in this medical institution by posting a permanent questionnaire at the reception desks and on the clinic's website.

After the improvements were implemented, a repeat survey was conducted: it turned out that the overall satisfaction with the work of the reception desk increased to 83.3%, and the organization of an appointment with a dentist through the reception desk became much more convenient and simpler, which is confirmed by the responses of respondents – 70.2 %. Communicative interactions between patients and dentists and medical personnel received higher ratings compared to the first stage of the study – 88.2 and 86.4 %, respectively. However, the comfort level of staying in the clinic and waiting for an invitation to see a dentist remained the same, which indicates the need for further measures to improve.

To summarize the above, the majority of respondents expressed satisfaction with the quality of medical care already at the first stage of the study. However, after the implementation of measures using lean production methods aimed at improving the work of the dental clinic taken under study, this indicator increased. Patients highly appreciate the professionalism and interaction with the attending dentists, which indicates the focus of the medical care organization on the needs of patients and the desire to satisfy their requests. Training sessions with practicing doctors on communication with patients has improved

the quality of interaction in the "doctor-patient" relationship, which has a positive effect on the patient's commitment to treatment in this clinic and the reputation of the organization. The implementation of lean production technologies in the daily activities of the front office has resulted in high patient satisfaction with the prompt work of first contact specialists. One of the most important issues concerning patient service is related to the process of making an appointment with a doctor. To solve the problem, it is necessary to optimize the work of the registry office by introducing modern technologies, such as electronic registration for an appointment with a doctor, improve the functioning of the registry call center, and ensure an even distribution of responsibilities among the registry staff of the medical institution.

CONCLUSIONS

The study found that the organization of medical care in institutions of the non-governmental health sector, among other things, requires constant improvements and changes. Patient satisfaction with the organization of the treatment and diagnostic process in a dental clinic can be modeled taking into account several factors. A decrease in patient satisfaction may directly depend on such important factors as waiting time for an appointment with a dentist; waiting time for medical services after an appointment with a specialist; availability of diagnostic tests and medical care from dentists; communication with medical and non-medical staff; comfort of stay in the

clinic. Identifying problem areas and working on them are key aspects of improving the organization of the treatment and diagnostic process. It is important to work individually with each of the above factors in order to increase the level of patient satisfaction.

Conducting a constant internal audit in any medical organization and subsequent correction of the identified problems will increase the level of satisfaction of the population with medical care.

REFERENCES

1. *Manashev T.O.* Development of stomatology in Russia after the crisis of 2009. *Socio-economic sciences and humanitarian studies* 2015; 5: 114–119 (in Russian).
2. *Izmerov N.F.* Actual problems of labor medicine. Moscow: LLC Firm “Reinfor” 2010; 132–162 (in Russian).
3. *Grisbina N.K., Perepelova O.V., Timurzieva A.B., Solovieva N.B.* Patient satisfaction as an indicator of patient orientation in organization of paid medical services. *Problems of Social Hygiene, Public Health and History of Medicine* 2023; 31 (1): 26–32 (in Russian).
4. *Karakulina E.V., Vvedensky G.G., Khodyreva I.N., Krosbka D.V.* New model of medical organization providing primary health care: methodical recommendations. 3rd edition with additions and clarifications. Moscow: 2023; 146 (in Russian).
5. *Lozovaya P.B., Shapovalova M.A., Kurmangulov A.A., Nelaeva Y.V.* Factors of demand for paid medical services and the main triggers of decision making on the choice of medical organization. *Universitetskaya Meditsina Urala* 2024; 10 (2; 36): 58–61 (in Russian).
6. *Krasova E.V.* Commercial medicine in Russia: development trends and demand factors. *Social Aspects of Public Health* 2022; 68 (4). DOI: 10.21045/2071-5021-2022-68-4-8 (in Russian).
7. *Shemetova G.N., Andriyanova E.A., Gubanova G.V. et al.* Communicative skills in the professional activity of a general practitioner and patient counseling. Saratov: V.I. Razumovsky Saratov State Medical University 2017; 200 (in Russian).
8. *Shemetova G.N., Ryaboshapko A.I., Belyaeva Yu. et al.* Modern vectors and technologies of professional training of nurses with higher education. *Modern problems of science and education* 2020; 4: 7 (in Russian).
9. *Belyaeva Y.N., Piskareva V.A., Malenova A.Y., Polidanov M.A. i dr.* Experience of integrating lean technologies into the quality management system of a medical organization providing primary medical and sanitary care. *Perm Medical Journal* 2024; 4 (in Russian).
10. *Zatulkin V.A.* Application of lean production model as an effective way to improve the activity of dental polyclinic. *Manager Zdravoochranenia* 2023; 8: 24–33 (in Russian).

11. *Metelskaya A.V., Kamynina N.N.* Development of the concept of “lean polyclinic”. *Problems of Social Hygiene, Public Health and History of Medicine* 2020; 28 (1): 785–790 (in Russian).
12. *Vagner V.D., Kireev V.V.* Analysis of the application of lean manufacturing tools in the dental service. *Stomatology* 2021; 100 (5): 67–70 (in Russian).

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