

NEW TECHNOLOGIES AND QUALITY IN HEALTHCARE

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Abstract: The purpose of this theoretical research is to draw attention to the role of innovation and new technologies in the activities of medical services. Two thesis are taken for consideration: first, that new technologies lead to better quality and optimization of treatment costs and second, that thanks to innovation and new technologies medical organizations can heal better and more efficiently. For many years different governments and institution tried to cure healthcare system. Results are not satisfactory. But there are same healthcare quality improvement trends and new technologies which change thinking about how healthcare actually works and how it contributes to health.

Keywords: quality, new technologies healthcare.

Introduction

Nowadays global market makes the organization run in tough competitions. The companies must be able to meet their customers, demands and expectation. Technology has great impact for both competitive advantage and development of countries. It is cheaper to transfer technology than to reproduce it. Organization are required to use and be familiar with new technologies. Technology transfer is identified, as the process for former and following use of technology, know-how, facilities, and expertise for a specific goal (Verbano, Venturini, 2012). Innovations and new technologies in, their implementation or proper management are perceived as an indispensable element of the functioning of medicinal entities. The purpose of this theoretical research is to draw attention to the role of innovation and new technologies in the activities of medical services. Two thesis are taken for consideration:

1. New technologies lead to better quality and optimization of treatment costs.
2. Thanks to innovation and new technologies, medical organizations can heal better and more efficiently.

Organizations noticed that quality is important factor for developing product and services to encourage sustained achievement. Quality can be competitive strategic instrument in business. In global competitive market, quality and technology have become two of important factors for business achievements and organizational grow. Organizations must move from multiple, disjointed initiatives focused on marginal cost reductions towards integrated strategies that improve outcomes by securing value of the money spent. Looking into new quality tools and assessment methods that can help medical organizations and patients build equitable and sustainable solution (Verboom, Montgomery, Bennett, 2016).

The health care organizations and institutions have one constant – which is change. While new medical technologies and scientific advances will improve patient outcomes and quality of life, it is good to believe that innovation in behind the scenes activities, such as technology, patient experience, and risk management, will serve as some of the primary drivers of industry advancement for the present and beyond. Modelling healthcare as either a product or a service neglects essential aspects of coproduction between doctors and patients.

The World Health Organization (WHO) has adopted six principles for building and measuring the quality of healthcare:

- 1) Accessibility measured by the scale of the reasonable use of care, regardless of the limitations that may be associated with geographical location, money, time, age, language, transport, architecture of the building, etc.
- 2) Equality provision of care for the entire population based on identified needs, regardless of the class of specialists, their cultural, social, racial character or other personal characteristics.
- 3) Adequacy of types of health services, package of services, procedures are adapted to the real needs of returning communities, they are needed, expected, required by the unit.
- 4) Acceptance health care takes into account the cultural and religious values of recipients, meets their expectations.
- 5) Efficiency available resources, such as: money, buildings, equipment, employees, are the best and the most rationally used. The basic principle is: the highest effect at the lowest cost.
- 6) Efficiency care fulfills its task in terms of benefits and effectiveness (Nadziakiewicz, 2018).

Healthcare Quality Improvement Trends

Many of healthcare organization participate in improvement efforts, from experiencing large scale, top, down organizational change to making small changes that improve the ways their team works and cares for patients. The popular ways of improvement are audit, the Model for Improvement (Batalden, Davidoff, 2007). Lean (Bicheno, Holweg, 2016) and more.

For many clinicians, however, the underlying question, “What is quality improvement, and how can it transform healthcare?” remains unanswered (Bicheno, Holweg, 2016). Appreciation of what it means to get more health from healthcare demands as full an understanding as possible of the systems to be improved. For many years different governments and institutions tried to cure the healthcare system. Results are not satisfactory. But almost everybody understands the importance of quality in healthcare.

In recent years, it has been noted that ensuring the quality of medical services is also due to other factors. Managers of medical entities are increasingly realizing that quality is an important asset of medical units. Facilities that are able to survive on the medical services market as well as acquire new patients ensure the appropriate level and quality of services rendered. Health care units should also keep up with the growing competition on the market. For medical facilities, the quality management system plays an extremely important role in cooperation with the National Health Fund. The National Health Fund as a public payer has been attaching great importance to quality management systems owned by medical entities for some time. The result of this is that the quality criterion is taken into account when assessing contract offers. To a large extent, it was the decision of the President of the National Health Fund that stimulated interest in quality standards in Polish healthcare, which resulted not only in the theoretical aspect of this issue, but also forced the implementation of systems and certification of management systems according to the ISO standard. Strengthening the importance of the quality criterion when assessing bids submitted through tender competitions regarding the conclusion of a contract for the provision of medical services was announced by the National Health Fund in 2013. The decision was to contribute to the promotion of medicinal entities with an implemented and certified quality management system in accordance with ISO. The Annex to the Ordinance of the President of the National Health Fund on determining the criteria for the evaluation of bids in the procedure for concluding the contract for the provision of healthcare services presents the criteria for "external quality assessment", and also specifies the issue of certificates, which are the basis for obtaining additional points.

There are some healthcare quality improvement trends which change thinking about how healthcare actually works and how it contributes to health:

- 1) Hospitals Using Smart Technology.
- 2) Patient-Customer Experience Personalization.
- 3) Augmented Reality Training.
- 4) Leveraging Data for Healthcare.
- 5) Using Wearable Devices in Healthcare.
- 6) Increasing Importance of Artificial Intelligence and the Internet of Things.
- 7) Technology Drive Efficiency.
- 8) Big Data and Analytics Transforming Data into Health Outcomes.
- 9) Interest in Population Health Management Will Grow.
- 10) Personalized Medicine.

Table 1.*The analysis of advantages of Healthcare Quality Improvement Trends*

Healthcare Quality Improvement Trends	Advantages
1) Hospitals Using Smart Technology	Clinics using robots that can monitor a patient without a human provider being in the room. Smart devices and applications continue to grow and spread throughout the healthcare field
2) Patient-Customer Experience Personalization	Patients must feel they are in a trusted environment that prioritizes respect and strong, open communication. Nurturing this environment requires organizations to consistently meet excellence standards across a wide variety of performance areas. Creating a culture that benefits patients and with engaged employees
3) Augmented Reality Training	Advantage of AR is that it makes it possible to train more providers at once. This is important because it could help combat the shortage of trained professionals around the world. Imagine a doctor being able to have treatment options appear on a screen as he looks at different conditions for a senior citizen during a routine checkup
4) Leveraging Data for Healthcare.	A benefit of automated systems is that they can filter through large amounts of data in real time to provide the best patient experience. Healthcare data comes in many forms, for example post-visit feedback surveys, create personalized healthcare plans, and potentially limit the spread of diseases before they grow out of control. It also allows providers to have a more complete view of each patient, which can potentially remove the pre-visit intake questionnaires
5) Using Wearable Devices in Healthcare	The most frequent users of wearable devices are people who are less healthy than average and are more likely to need to be hospitalized. Despite this, wearable devices are powerful tools to keep patients involved and invested in their personal health. Wearable devices are becoming one of the most sought-after innovations when it comes to digital health. The market is quickly diversifying as clinical wearables gain importance and as several important organizations integrate with each other. Data captured by these gadgets are playing an increasingly powerful role in healthcare. Wearable devices such as activity trackers encourage patients to stay more active and healthier on their own. This can decrease their need to see a doctor, while more advanced devices can monitor patient health metrics such as heart rate, diet, and blood pressure on the go. Instead of having to go to a clinic for monitoring, patients can do it at home and always be connected to a doctor. If a monitored patient's blood pressure spikes, the doctor can receive a notification and take action
6) Increasing Importance of Artificial Intelligence and the Internet of Things	There is going to be an increasing advancement in technology, making the use of technology crucial in healthcare and assist an already unbalanced workforce. AI and IoT will not only prove instrumental in enhancing accuracy in clinical insights, and security, but could also be fundamental in reducing manual redundancy and ensuring fewer errors as we transition to a world of quality in care. The computing power of AI drastically cut the time scientists spend analyzing data and testing molecular combinations as they tweak formulas and develop new ones

Cont table 1.

7) Technology Drive Efficiency	Consolidated information means organizations can better analyze and act on insights hidden in the data. Operational efficiencies are also achieved through consolidated work streams, automating tasks such as routine paperwork, and implementing predictive analytics. As data continues to assume a central role in healthcare, the correct approach and systems can translate to better health outcomes for patients, improved reimbursements, and a culture of proactive readiness
8) Big Data and Analytics Transforming Data into Health Outcomes	With the help of big data and smart analytics, we are at a point in healthcare we can make a near-certain prediction about possible complications a patient can face, their possible re-admission, and the outcomes of a care plan devised for them. Not only it could translate to better health outcomes for the patients, it could also make a difference in improving reimbursements and regulatory compliance
9) Interest in Population Health Management Will Grow	Population Health Management (PHM) is a discipline within the healthcare industry that studies and facilitates care delivery across the general population or a group of individuals. Furthermore, it is a proactive application of strategies and interventions to defined cohorts of individuals across the continuum of healthcare delivery in an effort to maintain or improve the health of the individuals within the cohort at the lowest necessary cost. As the risk for a population of patients shifts to the provider, health systems need to know more about the patients they serve
10) Personalized Medicine	Genetic tests for guiding treatment decisions are becoming increasingly available across diverse areas of medical care. These tests get more-effective drugs to patients earlier in their treatment and with fewer negative side effects, and some even reduce costs. Now, a physician can select a treatment based on a patient's genetic profile that may not only minimize harmful side effects and guarantee a more successful result, but can be less cost-effective compared with a 'trial-and-error' approach to disease treatment. As we move into a healthcare landscape increasingly customized for some patient, both in treatment and service, we must also make sure that we're expanding access so that more patients can benefit from its advantages.

Małgorzata Nadziakiewicz based on: Allwood D., Fisher R., Warburton W, Dixon J. (2018). *Creating space for quality improvement*. BMJ.

New technologies lead to better quality and optimization of treatment costs and thanks to innovation and new technologies, medical organizations can heal better and more efficiently. Healthcare organizations noticed that quality and technology is important factor for developing services to encourage sustained achievement. Medical e-visits, e-prescriptions and health monitoring via mobile devices will become more and more popular. Along with economic changes, the aging of the population and the prevalence of chronic diseases, the global healthcare sector has seen a dramatic increase in costs. Digital technologies and other new technologies are the solution to this problem.

New technologies in healthcare

The average life expectancy in OECD countries is over 80 years and it is constantly increasing. However, the number of people suffering from chronic diseases increases with it. In Europe, they account for as much as 77 percent of all diseases. This causes an increasing demand for health protection. As the report "A journey towards smart health. The impact of digitization on patient experience", prepared by the consulting company Deloitte, the biggest challenge for healthcare systems is to provide patients with high-quality services and access to care, while effectively managing costs and technological progress.

Medical e-visits, e-prescriptions and health monitoring via mobile devices will become more and more popular. Along with economic changes, the aging of the population and the prevalence of chronic diseases, the global healthcare sector has seen a dramatic increase in costs. As a result, specialists in the medical industry had to adapt and focus on the efficiency and quality of services or production.

Digital technologies are the solution to this problem. Not only patients, but also companies in the healthcare sector can benefit a lot from innovative solutions. Chronic diseases such as cancer, diabetes, cardiovascular and respiratory problems account for 77 percent. diseases in Europe and are responsible for 86 percent all deaths. They occur in over 80 percent. people older than 65 years. It is estimated that in the European Union, annual expenditure on chronic diseases is around 700 billion euros, which on average accounts for 70-80%. total health expenditure of one country. The increase in this type of disease is putting increasing pressure on health care and social systems in the EU. Currently, the biggest challenge for healthcare systems is to provide patients with high-quality services and access to healthcare while effectively managing costs and technological progress. In future it is expected that medicine will be fully predictable, preventive, personalized and participatory (P4 Medicine).

Innovative biotechnology, the possibility of insight into human genetics, precision in diagnosis as well as personalized medicine will significantly change health care. The dynamic growth of technology-based care requires the healthcare sector to redefine the roles and responsibilities of employees and adapt to the new way of working in the coming years, e-visits, e-prescriptions, as well as tracking disease progression, diagnosis and treatment through remote digital monitoring will become common, which will significantly help optimize staff time. According to the Deloitte report, 74 percent patients declare that they provide the same healthcare sector employees with the same information. What's more, 60 percent respondents repeatedly perform the same tests. Innovative solutions can improve patient data management, thus reducing the significant risk of duplication or neglect of collected information. Ultimately, doctors will be paid not for the number of visits or tests performed (the so-called service charge), but for Value-based Care. First of all, efficiency and effectiveness will be valued. Mobile applications and wearable devices (smartwatch, smart glasses, etc.) provide user-friendly solutions 24 hours a day. Thanks to the availability of new technologies, the sector can encourage patients to education and continuous monitoring of their health and promote

preventive measures in a cost-effective way. It will also help doctors to build a more informed patient base. Only in 2018, 78 thousand new mobile health applications were created, which increased their overall offer to 325 thousand. The number of healthcare applications has increased significantly in particular on two leading mobile platforms. In 2018, IOS recorded a 20% increase in annual terms, and in the case of Android this number increased by up to 50%. Health apps encourage smartphone owners to monitor and manage their health. Even 57 percent of subjects use an electronic device to track various indicators of their health. Still, only a third of them share this information with their physician.

There are many medical technologies which help patients return to a normal life. In Poland we have some new technologies in the benefits basket. According to Robert Rusak, president of the Polish Chamber of Commerce for Medical Devices Polmed stated that everything that new technology manufacturers, doctors and decision-makers in health care do, is for patients (Janik, 2019).

Dr Radosław Sierpiński, adviser and plenipotentiary of the Minister of Health for the establishment of the Medical Research Agency, emphasizes that the ministry highly appreciates the activity of the medical devices and medical technologies industry, because thanks to openness to discussions on this topic, it will be possible to develop a framework of real cooperation and create an ecosystem for non-drug technologies, which until now were treated somewhat neglected in Poland. In Poland, we have several thousand different non-drug technologies, which have so far more or less successfully entered the basket of guaranteed services. It is time to change it. Propose a specific, transparent system of entering them on the financing path so that these technologies, after their proper assessment, can be included in the healthcare system in Poland (Janik, 2019).

Conclusion

The newest trends in medical technologies and healthcare quality improvement trend can change the quality of life. There are many evidences that it really works. Thanks to the availability of new technologies, the sector can encourage patients to education and continuous monitoring of their health and promote preventive measures in a cost-effective way. It will also help doctors to build a more informed patient base. New technologies lead to better quality and optimization of treatment costs and thanks to innovation and new technologies, medical organizations can heal better and more efficiently

Thousand new mobile health applications were created, still increasing their overall. In Poland, we have several thousand different non-drug technologies, which successfully entered guaranteed services. The average life expectancy in OECD countries is over 80 years and it is constantly increasing so the quality of life and healthcare is very important issue.

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