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Telemedicine: the current state and prospects of development

The article deals with the state of telemedicine in Ukraine and in the world. from the analysis it follows that telemedicine in Ukraine has developed quite low in comparison with world achievements. Therefore, the development of such systems is a rather topical task.

Introduction

The development of information technology has penetrated into all spheres of human life, with the exception of medicine.

Modern technologies provide an opportunity to overcome thousands of kilometers in seconds, their application provides significant advantages:

- Distance counseling;
- control of the patient's treatment process;
- online control over transactions;
- providing psychological help and much more.

Telemedicine - a complex of actions, technologies and measures used in the provision of medical care, using the means of remote communication in the form of an exchange of e-mails [1].

According to the order of the Ministry of Health of Ukraine No. 681, the main goal of telemedicine is to improve the health of the population by ensuring equal access to appropriate quality services.

The main tasks of telemedicine are [1]:

- a) provision of medical care to a patient when distance is a critical factor in its provision;
- b) preservation of medical confidentiality and confidentiality, integrity of medical information about the patient's health;
- c) the creation of a single medical space;
- d) promoting the quality of care and optimizing the organization and management of health care processes;
- e) the development of systematic approaches to the introduction and development of telemedicine in the health care system.

A correct and timely diagnosis is one of the topical tasks of modern medicine, telemedicine is the tool that allows it to be realized. After analyzing the above, there is a need to develop a telemedicine system that works in real time and provides protection of medical information.

Telemedicine in the world and in Ukraine

According to studies conducted in [2], the growth rate of telemedicine market is increasing by 18-30% per year. The total US annual revenue in 2013 was \$ 9.6 billion and is projected to rise to \$ 38.5 billion in revenue by 2019.

37% of employers in the world have already offered telemedicine services to their employees.

According to a poll conducted by Intel, 72% of consumers said that they were ready to seek medical attention by telemedicine in non-urgent situations. Three well-known alliances of Connected Care, Anthem, MD Live and Teladoc have already reported satisfaction with telemedicine patients over 95% [2].

Consumers of health care services require convenient and high-quality care, and telemedicine offers it.

In Ukraine, telemedicine was first used in 1935 in Lviv, when Prof. Marian Franke and Prof. Witold Lipinsky organized the continuous use of tele-electrocardiography (TV-ECG). According to the publication in *Polska Gazeta Lekarska* (No. 27, 1937, p.15): "During the last 2 years in the Department of Infectious Diseases [the State General Hospital in Lviv, the present-day Lviv Regional Clinical Hospital] systematic tele-electrocardiographic examinations were carried out. The patients were in the department, and the results of heart examinations were transmitted to the Institute of Pathology for 500 meters. These tests were carried out together with Professor Franke "[3]

In 1994, negotiations with international telemedicine specialists in Ukraine took place and the first teleconsultations took place. Since the end of the 1990s the national TV-ECG network has been developing. In 2000, the first telemedicine center in Ukraine was founded (in the Donetsk Research Institute of Traumatology and Orthopedics).

Regional telemedicine networks have been operating since 2002. In 2006, a national non-governmental organization - the Association for the Development of Ukrainian Telemedicine and e-Health [3]

In Ukraine, in 2007, the State Clinical Research and Practical Center for Telemedicine of the Ministry of Health of Ukraine was created - the only specialized healthcare institution established for the introduction and development of telemedicine in Ukraine. Since 2009, the State Center for Telemedicine has been implementing a project for the creation of a telemedicine network in Ukraine, which has begun telemedicine counseling and exchange of doctors' experiences.

At present, rapid development and rapid implementation of telemedicine in all countries are taking place.

Problems of telemedicine and methods of their solution

In view of the widespread spread of telemedicine in the world and its development in Ukraine, the following main problems that need to be addressed in the implementation process can be distinguished.

First of all, the relevance of telemedicine to legal laws is important. In Ukraine, when implementing telemedicine, it is necessary to follow the order of the Ministry of Health of Ukraine No. 681 and DSTU of Ukraine on information security [1].

The next issue is hardware and software telemedicine. In particular, their cost needs to be taken into account, in addition, software and hardware should have a simple interface for users, including doctors and patients.

It is worth noting that software and hardware are selected depending on the tasks that telemedicine solves (for example, the need to process images in oncology or conduct video communications during online operations, etc.

These characteristics must be taken into account when designing new or selecting existing hardware and software.

A lot of research is devoted to the protection of information in the operation of telemedicine. Different methods of encryption can be used to protect the patient's personal data, and for the confirmation of the diagnosis or transmitted information, the doctor-consultant is advised to apply an electronic digital signature [4]

The question of the choice of diagnostic experts who are to diagnose is one of the least studied.

This problem can be solved with the help of a fuzzy logic device, taking into account all the correct and incorrect diagnoses given by a specific counselor, as well as the possibility of unauthorized access to information during consultations.

Conclusions

Today, telemedicine is becoming an effective way to provide timely medical care. Through the application of this technology, physicians from all over the world are given the opportunity to use the worldwide information database and share valuable experience with colleagues in different parts of the globe. These opportunities help to increase the level of development of medicine.

References

1. Order of the Ministry of Health of Ukraine No. 681 dated 19.10.2015 approval of normative documents on application Telemedicine in the field of health [Electronic resource]. - Resource access mode: www.zakon5.rada.gov.ua/laws/show/z1400-15.
2. Alliance for Connected Care. 2015: Another Unstoppable Year for Telehealth. [Электронный ресурс]. – Режим доступа до ресурсу: <http://www.connectwithcare.org/2015-another-unstoppableyear-telehealth/>.
3. Vladismirsky AV Telemedicine / AV Vladimirskey - Donetsk: Digital Printing House Ltd., 2011. - 437 s.
4. 4. Lukatsky A. Attacks on information systems. Types and objects of influence / A. Lukatsky // Electronics: Science, Technology, Business. - 2000. - №1. - Pp. 16-21.