The use of electronic technologies in medicine

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Abstract. The active devoted of the information technologies in medicine significantly facilitates the work of a doctor, but also creates a number of problems. One of them is related to the use in practice of documents on electronic media, including electronic medical records, and is related to personal information about the patient, which is strictly confidential and which can be stolen by unauthorized access using the capabilities of the Internet and especially social networks. Another problem associated with the use of electronic media is the possibility of uncontrolled introduction of false or erroneous information about the patient. One way to avoid mistakes associated with transferring information about one patient to an electronic document of another is to strictly identify each block of information. The importance of modern distance and multimedia teaching methods in the teaching process is emphasized. It is concluded that the future development of medical education in general, and the teaching of nervous diseases in particular, is associated with the combination of traditional methods with the capabilities of modern technical methods. Despite all the objective difficulties, it is vital to correct the situation. And here the professional experience of the doctor plays an important role. Given the fact that the use of these technologies is expanding more and more every year, the understanding of the complexities associated, with the ethical component of these methods, must be taken into account now.

1. Introduction

The active use of the information technologies in medicine significantly facilitates the work of a doctor, but also creates a number of problems. One of them is related to the use of electronic documents in practice, including electronic medical records. Of course, the use of these technologies not only significantly saves working time, allows you to create electronic data banks, facilitates the search for the necessary information, but also helps to avoid some mistakes, for example, prescribing a drug in the wrong dosage. In particular, the ability at any time to clarify the indications and contraindications for the appointment of a particular drug, as well as the necessary dosage, can significantly reduce the likelihood of its erroneous appointment.

When choosing a particular drug, you should take into account the expected positive effect—in comparison with possible reactions. The neurologist should raise this issue in a conversation with the patient and make sure to leave an entry about it in the medical documentation. The probability of erroneous prescribing of certain medications increases if the patient is treated by no one doctor, but turns to several specialists at the same time. The widespread use in practice of electronic medical records (and other means based on computer programs) significantly reduces the likelihood of errors, for example, incorrect reading of the name of
a drug written in a bad handwriting or incorrect decoding of an abbreviation. In addition, some electronic systems already have built-in routines to check the correctness of prescribing (including dosages) of certain medicines. All this significantly reduces the possibility of erroneous prescribing of medicines. A considerable number of errors will be avoided by standardizing medical documentation (including drug names) between providers and medical institutions.

2. Methodology and approaches
It should also be taken into account that patients are becoming more and more "educated" from year to year. This is facilitated by a large number of medical and paramedical publications, and, of course, the introduction of the Internet into our lives. It would be nice if all these publications – both in paper and electronic form – were written at a good level. Unfortunately, it should be recognized that a significant part of them very superficially sets out very serious issues, and some are simply harmful. Therefore, one of the tasks of a doctor, regardless of his specialization, is to deal with such low-quality publications. And this is one of the manifestations of his civic position.

Nevertheless, it should be noted that most of the mistakes made by doctors do not lead to threatening complications for the patient, and because of this, in the vast majority of cases, it is not noticed either by the patient himself or his relatives. However, in almost a third of cases, they can be prevented with proper management of the patient. Basically, these are errors associated with unjustified restriction of the diet, and shortcomings in the interaction of specialists involved in the management of the patient on this issue. Another problem is the side effect of prescribed medications, but, as mentioned above, the increasing introduction of computer information technologies in practice can reduce the number of these errors.

Use of information technology, on the one hand, significantly facilitates the work of a doctor and, ultimately, improves the quality of medical care provided. On the other hand, every technical innovation carries a potential risk, and electronic medical records are no exception in this regard. First of all, this applies to personal information about the patient, which is strictly confidential [1; 2] and which can be stolen by unauthorized access using the capabilities of the Internet and especially social networks [3]. At the same time, sometimes financial or scientific conflicts of interests spill out into society, using modern information technologies, for discussion by non-specialists [3]. What happens as a result is not difficult to imagine. There are more than enough examples of this in the surrounding life. The judgment of an incompetent person who is not familiar with the specifics of the subject, in this case, medicine, but considers himself a "specialist", moreover, supported by the same "socially active" individuals, can lead to very serious consequences, including for the mental and physical health of not only the individual patient, but also the nation as a whole. Of course, this problem also existed when medical information was stored only in paper form, but its storage in electronic form allows not only to copy the available data much faster and easier, but also to do it unnoticeably.

Another problem associated with the use of electronic media is the possibility of uncontrolled introduction of false or erroneous information about the patient. Errors can also occur at the stage of copying fragments of electronic documents. Moreover, if this is done by the attending physician who knows the patient well, he can easily notice such an error. And if it is done (which, in fact, often happens) by a completely different person, for example, the doctor on duty, who has no idea about the patient? The fact that many doctors use their own templates to fill out electronic documentation can also lead to an increase in the number of errors. Of course, creating a template saves a lot of time. However, this raises the possibility of an error due to the fact that the same template can be used to describe the history and status of completely different patients without editing. Sometimes errors, including quite serious ones, occur when patients independently fill out electronic questionnaires that provide answers "yes" or "no" - without any gradation. If the data obtained in this way is analyzed by an inexperienced or
inattentive specialist, then he can easily take the signs, for example, of a myocardial infarction for the symptoms of reflux esophagitis [1].

One of the ways to avoid errors associated with the transfer of information about one patient to an electronic document of another is to strictly identify each block of information, namely, where it was taken from, and by whom it was transferred. In this case, the person working with this document can easily find the mistake made earlier in the future. Errors can also lead to a vicious practice, when the doctor pays more attention to the monitor when filling out electronic forms, and not to what and how the patient says [1; 3]. In such a situation, in addition to the possibility of missing important information for the diagnosis, you may not get or lose the previously acquired necessary psychological contact with the patient [3]. However, in addition to the subjective, there is also an objective factor that makes it difficult to communicate with the patient – this is the time that the doctor can devote to the patient [3]. It is an axiom that the attending physician should be able to correctly collect complaints, assess the history of the disease and life, adequately evaluate the results of the studies and outline a plan for further research [1]. Only in this case will it be possible to get a complete and adequate idea of the patient, about how best to help him. There are a number of reasons that do not allow the doctor to use the time to communicate with the patient at his own discretion, to the extent that is necessary in each specific case, which is associated with the logistics adopted in a particular medical institution, financial feasibility, limited medical resources [3].

However, despite all the objective difficulties, it is vital to correct the situation. And here a great role is played by the professional experience of the doctor, his ability to feel in which situation and which patient needs to be given more time, for example, explaining in detail the features of the existing disease, the advantages of certain methods of therapy. Sometimes this approach has a greater therapeutic effect than the use of the most modern, often expensive medicines. It should be noted that we are talking here not only about psychosomatic disorders, often such an approach helps very significantly with pathology without a leading psychogenic component.

Another problem associated with the use of information technologies in medicine is caused by the use of distance and multimedia learning methods. These methods are used both for teaching students and for training in the field of neurology of already established specialists, both neurologists and non-neurologists. The understanding of the possibilities of electronic methods as aimed solely at facilitating testing is very limited. Surveys of students in the United States show that 99% of respondents believe that these methods improve the process of mastering educational material, including writing test tasks, 89% - that they reduce the time spent on studying [4]. These methods have become particularly important in the field of urgent neurology, where rapid decision-making is required. It is important to emphasize that the currently existing electronic learning tools allow you to individualize this process, in particular, adapting the tasks presented to the level of knowledge of the subject. This is probably one of the most valuable features of this type of training. It is interesting to note that according to some data, it is the ability to develop an individualized approach that allows you to reduce the time spent on mastering the material by almost 20% [4].

It is optimal to teach a student at the patient’s bedside, when together with the teacher, the patient’s existing disorders are analyzed, and the tactics of examination and treatment of this particular patient are developed [5]. Of course, such an approach requires time and effort-both on the part of the teacher and on the part of the student, but the result more than pays for the time spent.

At the same time, we should not detract from the possibilities of modern technical methods. Thus, the development of telemedicine, especially in the field of emergency medicine, has long gone from a purely consultative method used on a case-by-case basis, and has moved into the category of everyday practice, and the ability of smartphones to record, for example,
epileptic seizures, significantly facilitates diagnosis in this category of patients and allows remote monitoring of the patient’s condition [4].

It should also be noted another point related to the increasing use of information technologies in education – the impact of this factor on the cost of medical education. According to Western experts, the cost of medical education is increasing, both at the pre-graduate and postgraduate stages [6]. This is due to a number of factors – an increase in the cost of training itself, changing social and household factors, and the large use of modern expensive technologies in the learning process. All this leads to an even greater stratification of society. Thus, in the United States, Hispanics make up 12% of the population, and among doctors of all specialties-only 3.5%; Afro-Americans, who make up 1/8 of the population, are found among doctors in only 5% [6].

The modern world is characterized by dynamism - the movement of significant population groups from one region to another. In the United States alone, first-generation migrants make up about 30% of the population, and by 2050 their share will exceed 50% [3]. And, of course, when providing medical care, there are traditionally a number of problems associated not only with the language barrier, but also with the confessional and cultural characteristics of these groups of patients. Helping the patient and their loved ones to make an informed decision is one of the basic principles of medicine. And here it is very important that the patient can understand the essence of the problem, the importance of his decision – which is an extremely difficult task without the doctor’s knowledge of the patient’s native language [3]. In addition, certain methods of examination and/or treatment may conflict with national customs and religious restrictions. Of course, it is quite problematic to expect every doctor to speak the languages of national minorities, although this would be extremely useful for the correct assessment of complaints and an adequate analysis of anamnestic information [3]. In addition to the language barrier, there may be difficulties associated with national and religious customs and prohibitions that exist among the peoples whose representatives the patients may be. For example, for some peoples and religious groups, it seems unacceptable at first glance to use medicines containing alcohol or animal tissues and vaccines, transfusions of blood and its preparations, the use of donated organs and tissues, the appointment of certain therapeutic diets, etc. Accordingly, the doctor must have a sufficient amount of erudition in the field of history, cultural studies, and sometimes religious studies in order to, if not completely avoid, then at least minimize the number of conflict situations and refusals from treatment associated with the above contradictions.

Conclusions

Thus, the use of modern information technologies in medicine significantly improves the provision of care to patients, but also creates certain problems. Given the fact that the use of these technologies is expanding more and more every year, the understanding of the complexities associated, inter alia, with the ethical component of these methods should be taken into account now.

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