




Original article

Reprint

Readiness for digital communication and the need of patients to transfer medical services to a remote format

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Abstract:

Objective: to assess the readiness of patients for online communication with a healthcare worker and the demand for medical care in a remote format.

Materials and Methods. We interviewed 507 patients using the original questionnaire, which allowed obtaining data on the respondents' experience in using online communication with a doctor, their readiness for digital health care instead of office visits, and the impact of Internet resources on the patient's trust in the recommendations given by the attending physician.

Results. We established that 30.6±2.1% of patients used online communication with their doctor, while 40.5±2.2% would like to have this opportunity. We observed a difference in readiness for digital communication between groups of respondents interested in pediatricians (parents of children attending city children's polyclinics) and groups of central district hospital patients and multidisciplinary city hospital patients ($p < 0.001$). The effect of age on the patient's readiness for online communication has been confirmed. The most in demand in the remote format were referral services (for laboratory tests and hospitalization), especially in the group of parents of children attending city children's polyclinics. The study of the patient's behavior in relation to the search for a second opinion on the Internet showed that the majority of the respondents did not intend to double-check their doctor's prescriptions, and the absolute majority of respondents (82.8±1.7%) trusted more their attending physician than Internet sources.

Conclusion. The results of the study indicate the readiness of the population to implement digital communication and transfer part of medical care to the digital sphere. The most in-demand services were those for issuing referrals for hospitalization and to specialists, as well as for tests and pharmaceutical prescriptions that the patient receives on an ongoing basis.

Keywords: digitalization in healthcare, digital communication, physician-patient dyad

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Introduction

The processes of informatization in Russian healthcare, which took place in the first decades of the 21st century, substantially changed the industry and prepared the conditions for its digital transformation. The development of such fields as telemedicine, the Internet of Medical Things, artificial intelligence, robotics, along with the use of electronic document management systems, distance professional training, and virtual modeling in scientific and clinical practice are already radically changing the customary interaction between medical workers and patients and the organizational structure of medical institutions, thereby ensuring the quality and accessibility of medical care [1]. At the same time, the current stage of healthcare development is characterized by numerous problematic issues, which include disproportion in the structure of financial support, contradictions between the right to free health care for all citizens of the Russian Federation and the growth of paid medical services, overstated expectations of patients, a low rate of growth in the salaries of medical workers and a decrease in their quality of life, and a shortage of medical personnel, especially in rural areas [2, 3]. It is expected that the digitalization in healthcare will solve some of these

problems. However, this will only happen if patients and healthcare workers are ready to use digital communication regarding health issues and accept digital medicine, while researchers note a gap between the capabilities of digital technology and the level of existing digital skills and competencies of the population [4].

Consequently, the goal of our study was to assess the readiness of patients for online communication with a healthcare worker and the demand for medical care in a remote format.

Materials and Methods

The study was conducted on the basis of two multidisciplinary city hospitals (MDCH) located in Nizhny Novgorod, the central district hospital (CDH) of the Gorodetsky District in the Nizhny Novgorod Oblast and two city children's polyclinics (CCP) of Nizhny Novgorod. The choice of the institutions for our study was based on the readiness for digital communication with a physician and its demand among categories of patients living in urban or rural areas and communicating regarding their health or the health of their children attending a CCP. The study was conducted

using the original questionnaires, which included the following groups of questions for respondents:

- Demographic traits of patients (age, gender);
- Frequency of attending medical establishments: 1-2 times or 3-4 times annually, or nearly monthly;
- Use of digital communication with the attending physician (via e-mail, instant messaging, online services, etc.);
- Inclination to use digital communication (via e-mail, instant messaging, online services, etc.) with the attending physician vs. the preference of face-to-face communication with a medical professional;
- Medical services that survey participants would like to receive using digital technology;
- Experience in using Internet resources for self-diagnosing and double-checking the prescriptions by the attending physician (constantly / occasionally / rarely / almost never);
- More confidence in recommendations received from a doctor or from Internet sources.

The survey involved 507 patients, of which 204 respondents were patients of a MDCH, 213 were patients of a Central District Hospital and 90 people were parents of children receiving medical care at a CCP. The sociodemographic characteristics of the sample are as follows: 33.1% male vs. 66.9% female; three age groups of similar sizes (20-39 years of age: 35.7%; 40-59 years of age: 32.7%; 60 years of age and older: 31.6%).

Statistical data processing was carried out using the Excel software by calculating the arithmetic mean and its error. Comparative analysis was performed by the Pearson's chi-squared test and comparing χ^2 -value with the critical value, taking into account the number of degrees of freedom.

Results

The distribution of responses in patient groups regarding digital communication with the attending physician and the desire to have such an opportunity or lack thereof are presented in *Table 1*.

Table 1. Distribution of respondents (%) by practical use of digital communication with the attending physician

Respondents' answers	Patients			Respondents of all groups combined
	MDCH	CDH	Parents of CCP patients	
Using email and instant messaging when communicating with a doctor				
Yes, I already use	29.1±3.2	24.8±3.0	47.8±5.3	30.6±2.1
I do not use	70.9±3.2	75.2±3.0	52.2±5.3	69.4±2.1
Stated a desire/unwillingness to use email and instant messaging when communicating with a doctor				
I would like to use them	38.6±3.4	31.9±3.3	64.4±5.0	40.5±2.2
No, I do not want to use them, I only need a real doctor	61.4±3.4	68.1±3.3	35.6±5.0	59.5±2.2

MDCH, multidisciplinary city hospitals; CDH, central district hospital; CCP, city children's polyclinics.

According to the survey results, approximately two-thirds of respondents (69.4±2.1%) did not use digital technology for communication with a clinician; accordingly, 30.6±2.1% of patients use digital communication with the attending physician. Remarkably, almost half of parents (47.8±5.3%) received remote recommendations from pediatricians, which was observed much less frequently in the case of MDCH and CDH patients: 29.1±3.2 and 24.8±3.0%, respectively. Statistically significant differences were revealed between CDH patients and parents of CCP patients ($\chi^2=14.3$; critical value: 0.05; $p<0.001$, as well as between MDCH patients and parents of CCP patients: $\chi^2=8.8$; critical value: 0.05; $p<0.001$).

The age factor had a significant impact on the use of digital communication ($\chi^2=31.2$; $p<0.001$). While the proportion of patients using the digital format of communication with a doctor in the age groups up to 60 years ranged from 37.5±3.8% to 39.8±3.6%, it was just 13.3±2.8% in the age group over 60 years. The effect of the gender and the effect associated with the need for medical care were not observed.

The desire to use digital technology to communicate with a doctor was expressed by 40.5±2.2% of respondents. Such people prevailed in the group of interviewees interested in pediatric care (64.4±5.0%) vs. the groups of CDH patients and MDCH patients (31.9±3.3% and 38.6±3.4%, respectively). The differences were statistically significant ($\chi^2=28.0$; $p<0.001$).

Age had a significant impact on the intention to use digital communication to interact with a doctor ($\chi^2=40.7$; $p<0.001$). In the age group of 20-39-year-old patients, 52.5±3.7% of respondents were ready to switch to online communication with a health care professional, while among people aged 40-59 years, this proportion was 45.9±4.0%, and in the group of 60 years and older, it was just 20.7±3.4%. The intention to interact remotely with a doctor did not depend on the gender or frequency of scheduled medical appointments.

The most popular medical service in the format of a digital appointment for all categories of respondents was receiving referrals (to specialists, for tests, for hospitalization): the share of those who chose this response option was 36.6±2.1%. Moreover, this proportion was statistically significantly higher and amounted to 58.6±5.0%: among CDH patients, it was 34.2±2.4%, while in the group of MDCH patients, it was 33.0±2.5%. Statistically significant difference was established in parents of CCP children with MDCH patients ($\chi^2=28.4$; $p<0.001$) and with CDH patients ($\chi^2=29.6$; $p<0.001$). At the same time, parents of CCP patients were less interested in obtaining prescriptions via the Internet (12.1±3.3%) and receiving online consultations from specialists (7.1±2.6%) than CDH patients (28.2±2.3% and 12.9±1.7%, respectively) and MDCH patients (20.5±2.2% and 15.6±2.0%, correspondingly). The need for a digital format for issuing certificates and sick leave certificates was characteristic for similar shares of respondents in all groups (20.5±2.2%, 16.6±1.9% and 21.2±4.1% for CCP, CDH and MDCH patients, respectively).

Age influenced the patient's choice of remote format for certain services ($\chi^2=32.9$; $p<0.001$). In the age group of 20-39-year-old patients, there was a higher need for issuing certificates and sick leave certificates (24.3±2.4%), while in

the age group of 40-60-year-old patients, it was 18.2±2.3%; and in the group of patients 60 years of age and older, it was still lower (12.4±2.3%). The ability to obtain a pharmaceutical prescription online was desired by 20.45±2.3% of respondents aged 20-39 years, 23.7±2.5% of patients aged 40-59 years, and 25.4±3.0% of patients aged 60 years and older. Online consultations were preferred by 14.4±2.1% of patients aged 20-39 years vs. 10.5±2.1% of patients aged 60 years and older. The remote referral to a specialist, for laboratory tests, and for hospitalization was almost equally preferred by all age groups, ranging from 34.3% to 38.7%.

The need for medical care (frequency of medical appointments) did not affect the opinion of patients.

The examination of patient behavior in relation to searching for a second opinion on the Internet showed that most respondents were not likely to double-check the prescriptions of their attending physician using Internet sources (32.3±2.1%: 'almost never' response option; 32.5±2.1%: 'rarely' response option). At the same time, 25.9±2.0% of patients searched for a diagnosis on the Internet and double-checked the doctor's prescriptions occasionally, and only 9.2±1.3% did this constantly (Table 2).

Parents of CCP patients turned to the Internet to search for information and double-checked doctor's prescriptions significantly more often than other groups of respondents, with every 5th survey participant doing so on a regular basis. Statistical significance was found between the responses of parents of CCP patients and other interviewees (vs. CDH patients: $\chi^2=13.3$; $p<0.001$; vs. MDCH patients: $\chi^2=23.1$; $p<0.001$).

Women were more likely to double-check information received from a doctor using Internet sources (12.5%±1.9% did so constantly and 28.2±2.5% occasionally). At the same time, 44.3±4.2% and 27.6±2.5% of men, correspondingly, were not inclined to double-check their doctor's knowledge using Internet resources. The difference between opinions of women and men in this regard was statistically significant ($\chi^2=40.7$; $p<0.001$).

With age, respondents were less likely to double-check their doctor's diagnosis and prescriptions on the Internet ($\chi^2=63.4$; $p<0.001$) (Figure).

Table 2. Distribution of patients (%) by additional use of Internet sources and double-checking the attending physician's prescriptions

Respondents' answers to the question, "How often do you look for a diagnosis on the Internet or double-check your doctor's prescriptions on the Internet?"	Patients			
	Respondents of all groups combined	MDCH	CDH	Parents of CCP patients
Constantly	9.2±1.3	6.0±1.7	7.21±1.8	21.1±4.3
Occasionally	25.9±2.0	20.0±2.8	29.3±3.2%	31.1±4.9
Rarely	32.5±2.1	38.5±3.4	30.8±3.2	23.3±4.5
Almost never	32.3±2.1	35.5±3.4	35.5±3.3	24.4±4.5

MDCH, multidisciplinary city hospitals; CDH, central district hospital; CCP, city children's polyclinics.

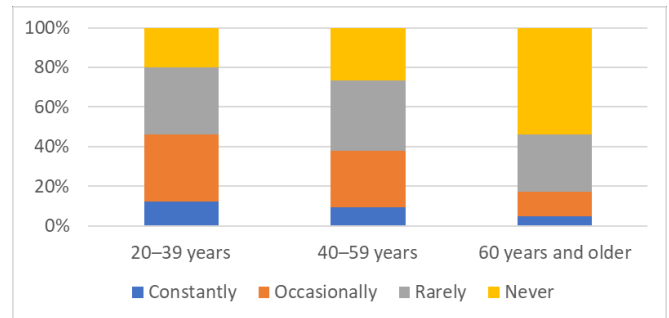


Figure. The effect of the age on the tendency of patients to double-check the doctor's recommendations and prescriptions in Internet sources, %

Patients aged 20-39 years most often double-checked recommendations given by the doctor during an appointment (12.4±2.4% constantly and 33.9±3.5% occasionally). In other age groups, such proportion decreases with age (40-59 years: 9.5±2.3% constantly and 28.5±3.6% occasionally; 60 years and older: only 4.8±1.9% constantly and 12.4±2.7% occasionally). The reverse trend was also observed: more than half of patients (53.9±4.1%) aged 60 years and older almost never searched for a diagnosis on the Internet and did not double-check doctor's prescriptions. In the groups of 20-39-year-olds and 40-59-year-olds, 19.9±2.9% and 26.6±3.5%, respectively, never turned to Internet resources for a second opinion.

In addition, statistically significant differences were revealed between groups of patients with different frequencies of medical appointments ($\chi^2=13.6$; $p=0.035$). E.g., patients who attend medical institutions monthly were more likely to constantly search for a diagnosis and double-check doctor's prescriptions on the Internet (17.6±4.4%). Patients who visited the hospital 1-2 times or 3-4 times annually were less likely to constantly double-check doctor's recommendations (8.4±1.8% and 7.4±2.1%, respectively).

However, despite the intention to double-check the doctor's prescriptions, the vast majority of respondents (82.8±1.7%) trusted the attending physician rather than recommendations seen on the Internet. The doctor was trusted most of all by CDH patients (97.6±1.1%) and parents of CCP patients (92.2±2.8%), while the proportion of trusting patients among those in MDCH was statistically significantly lower (64.3±3.3%, $\chi^2=88.9$; $p<0.001$).

The level of trust in a face-to-face doctor's prescriptions did not depend on the gender or the need for medical care. Nevertheless, statistically significant differences were found in the level of declared trust between age groups ($\chi^2=60.2$; $p<0.001$). For instance, among all age groups, people aged 60 years and older trusted the doctor the least: 64.7±3.8% vs. 35.3±3.8% of those who trusted more the Internet sources. This is noteworthy, since it was also established that elderly people were less likely to double-check the diagnosis and doctor's prescriptions. At the same time, people 20 to 39 years of age expressed the highest trust in the doctor (94.6±1.7%); while among patients aged 40-60 years, 88.2±2.5% trusted their physician.

Discussion

Our study showed that the use of electronic channels of communication with the attending physician is relevant for a significant share of patients (29.1% and 38.6% of patients in MDCHs, 24.7% and 31.9% of patients in CDHs, and 47.8%

and 64.4% of parents of patients in CCPs, respectively, use or would like to use those).

Many domestic and foreign studies also noted significant interest on the part of patients in using digital technology and online services to communicate with a medical professional [5, 6]. At the same time, patients cite convenience and cost reduction as advantages of digital interaction, while their main concerns are related to maintaining confidentiality and the doctor's ability to adequately assess the patient's physical condition remotely [7]. In our study, patients also expressed their willingness to transfer to an online format only those medical services that are now largely provided without the participation of a physician (issuing referrals, certificates and pharmaceutical prescriptions for medicinal drugs that the patient receives on an ongoing basis), while online consultations were approved by only 13.3% of respondents. We observed a relationship between the readiness to transfer medical services to the digital sphere and the health condition. The less often patients see doctors, the more positively they view the possibility of electronic health care.

The effect of age on the readiness of patients to use digital technology when receiving medical care has been statistically confirmed, which clearly indicates the need to develop special adaptation programs for older patients when introducing digital communication with doctors. The need for additional support and motivation when using electronic health tools for patients born in the pre-digital era (50 years of age and older) is also evidenced by foreign studies [8].

The wide availability of medical information has exacerbated the issue of trust, which largely determines adherence to medical treatment, the effectiveness of treatment, the level of satisfaction of the patient and his or her family members with medical care and the health care system as a whole, as well as the level of satisfaction on the part of the doctor with the process of working with the patient [9]. However, despite the fact that nearly every third respondent constantly or occasionally turns to Internet sources in order to double-check the prescriptions by the attending physician, the absolute majority of respondents trust their doctor rather than recommendations found on the Internet. In these conditions, the potential of digital communication technology in the physician-patient dyad and the patient-healthcare establishment dyad can have a positive impact on improving communication and strengthening patients' trust in the doctor [10].

Conclusion

The results of our study indicate the readiness of the population for digital communication and the transfer of part of medical care to the digital sphere. The most in-demand services for transfer to the digital mode were the referrals for hospitalization, to specialists, as well as for tests and pharmaceutical prescriptions that the patient receives on an ongoing basis. The age factor has a significant impact on the readiness of patients to receive medical care using digital tools, which must be taken into account in the course of their implementation.

Conflict of interest. None declared by the authors.

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