

The Application of Online Health Resources by the Population in Adverse Epidemiological Conditions

Mariia S. Soboleva

Associate professor, Professor of the Department of Pharmacy and Pharmacology, Far Eastern State Medical University; 680000, Russian Federation, Khabarovsk, Muravyov-Amursky St., 35, Doctor of Pharmaceutical Sciences

ABSTRACT

There are a significant number of studies around the world on the use of telemedicine and online resources in medical practice, but data on the population use limited. In the context of the pandemic, it is possible to predict an increase in demand for the use of digital technologies for medical care, especially among the main Internet users - young people.

The aim of the study is to analyze the attitude of patients to the use of online resources in obtaining medical care in the pandemic 2020-2021.

Material and methods: sociological survey of the population (n = 726) using the Google Forms service. Results: much of the population surveyed prefers to seek help directly from a medical organization, rarely using online counselling. Modern Internet resources are used to self-evaluate the state of health and «check» prescribed drugs once every 3-4 months. Online consultation of a medical specialist is more often perceived as an alternative source of information or as an addition to a direct visit. More than a third of patients follow doctor's prescription partially even after a direct visit to the doctor, and in the case of online consultations, compliance is reliably correlated with the attitude towards her.

Conclusion: the use of online technology to obtain medical care remains limited and is often negatively perceived by the population.

Corresponding Author e-mail: martimser@mail.ru

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INTRODUCTION

In 2020-2021, the world's health care faced a number of difficulties: the pandemic caused by coronavirus SARS-CoV-2, the lack of developed therapy algorithms, the high burden on the outpatient and inpatient medical organization, the lack of specialists, etc. Worldwide, morbidity has reached enormous numbers - more than 248 million, and mortality - more than 5 million (as of November 3, 2021). At the same time, people who were lucky not to get sick faced other medical problems. One of the main ones was the decrease in the availability of medical care, especially specialized. The forces of the entire world health were reoriented primarily to help those infected with COVID - 19, while at the same time, patients with other acute and chronic diseases, as well as the need for a planned surgical intervention, had difficulties due to repurposing medical organizations, in addition, even in the conditions of visiting the clinic, the risk of infection remained, not only for patients, but also for medical workers.

One way to get medical care, without health risks, is to apply modern online resources and telemedicine. Prospects and opportunities, as well as problems arising from the use of them in modern realities, are being actively explored throughout the world.

According to a systematic review conducted in the USA, the use of telecommunications reduces several geographical and temporal obstacles between physician and patient, but there are problems with technical personnel (11%), resistance to change (8%), high cost (8%), dependence on age (5%) and educational level (5%),^[1] socioeconomic status and patient language.^[2, 3] The data obtained in a study in Israel demonstrate the problems of obtaining informed consent, medical confidentiality and privacy, documentation and liability, the use of artificial intelligence and future legal claims.^[4]

The active introduction of telemedicine also occurs in the provision of specialized medical care: reducing racial and geographical barriers in the conduct of pregnancy, the possibility of additional research, informing about best medical practices,^[5] improving remote specialized urological clinical care in Europe, addressing mobility-limited patients, reducing clinic visits, reducing the risk of virus transmission,^[6] improving child weight management (USA),^[7] providing community-acquired care for

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Parkinson’s disease and amyotrophic lateral sclerosis,^[8] improving blood pressure control in Asian countries, using a modern arsenal of antihypertensive drugs, the most effective cardiovascular prevention in order to reduce cholesterol,^[9] providing rapid access to specialized cancer care in a complex scenario in Peru,^[10] increased adherence and control of bronchial asthma in USA school children.^[11] reduction of potential spread of diseases and prevention of health system overload through home screening, diagnosis and monitoring of COVID-19, implementation of mHealth sensors in the USA to improve control over pandemic.^[12]

Devices based on medical software can provide valuable information about the health of the patient, to improve the quality of life, for example, in elderly, immunodeficient patients, pregnant women. The prospects of using telehealth are reducing the time for diagnosis and initiation of treatment; minimizing the risk of in-hospital infection, inter-hospital transfers; coordinating the use of health resources in remote areas; informing the public; decrease rescue emergency transport services cost, disposable protective clothing, antiseptic materials, gloves, reducing disinfection of hospital places,^[13, 14] etc. Training of doctors, in the USA and other countries is also carried out using online technologies, including through social networks, online surgical atlases and widespread dissemination of lectures by a “virtual visiting professor”.^[15]

Researchers in Korea summarized the experience of telemedicine in the main recommendations: the preference for use after a direct visit to the doctor, the need to obtain patient consent, training staff on the use of telemedicine, the choice of appropriate devices and platform, the need to form a team with separation of duties, the mandatory application of standard treatment recommendations.^[16]

In the Russian Federation, medical practice has long used online resources (consultations, webinars, consultations, patient health control, etc.), but data on their direct use by the end user by the population are limited. In a pandemic, it is possible to predict an increase in the demand for online consultations of doctors, as well as the frequency of use of electronic resources. The main users of the Internet are young people, respectively, it is in this age category that it is more representative to conduct a sociological survey. Research objective is the analysis of the relation of patients to application online resources when receiving medical care in the conditions of a pandemic 2020-2021.

MATERIAL AND METHODS

The survey of the population was carried out in the city of Khabarovsk in October 2021. To minimize the risks associated with the spread of a new coronavirus infection, the survey was conducted online using Google Forms (<https://docs.google.com/forms/>). The sample was 762 respondents. The sampling error with 95% confidence probability and 50% trait fraction was 3.55%. The mathematical calculation of the data was carried out using the Microsoft Excel 365 Data Analysis package. The coding of the responses received was used. Statistical analyses were performed using IBM SPSS Statistical 25. For single blocks of questions, Cronbach’s alpha ($\alpha = 0.851$) was calculated. The Mann-Whitney U test was used to compare the distributions

of two independent samples. The null hypothesis of equality of distributions was rejected with asymptotic significance $p < 0.05$. To compare the distributions of several independent samples, the Kruskal-Wallis H Test was used. The null hypothesis of median equality was rejected with asymptotic significance $p < 0.05$. Correlation of respondents’ responses with age and sex traits was calculated using the Spearman’s rank correlation coefficient. A valid correlation was considered at two-sided significance $p < 0.05$.

RESULTS

The response characteristics are shown in Table 1.

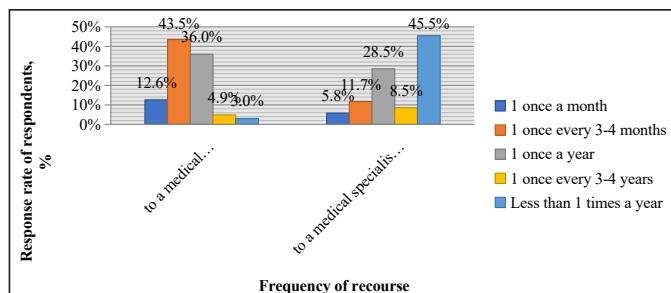
The results can be summarized into the average profile of the respondent: female sex, age 18-25 years, technical profile of work or study. It was the most representative age category (18-36 years old) that was the target audience when conducting this study, because it was young people, according to Mediascope, who are the most active users of Internet resources and online technologies in the Russian Federation.^[17]

At the initial stage of the study, respondents characterized the frequency of access to a medical specialist (Figure 1).

More than 43% of respondents go directly to the clinic or hospital once every 3-4 months, and 36% - once a year.

Table 1: Characteristics of respondents

Characteristic	Characteristic Response	Rate (share of response)
Sex	Female	64,26%
	Male	35,74%
Age group	18-25 years	69,25%
	26-35 years	10,51%
	36-45 years	11,17%
	46-65 years	7,75%
	more 65 years	1,31%
Area of work/study	Technical	24,57%
	Medical	16,69%
	Humanitarian	14,32%
	Other	10,91%
	Economic	9,86%
	Services	8,41%
	Trade	5,78%
	Culture, art	4,99%
	Natural Science	4,47%



* - $p < 0.05$ - differences in the distribution of respondents’ responses are reliable

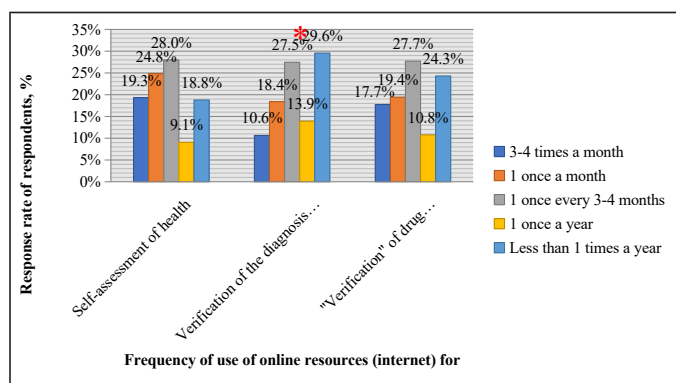
Fig. 1: Frequency of recourse medical care

Contrary to the severe epidemiological situation in 2020-2021, the increased load on the outpatient and polyclinic link, the decrease in the availability of specialized care, more than 45% respondents turn to the online medical specialist less often 1 time a year/did not contact at all. Differences in the distribution of respondents' responses were valid. There was a significant correlation with the characteristic of the sex of respondents: women were more likely to contact the medical organization directly ($p = 0.001$; $r_s = 0,137$). And also, with the characteristic of age: younger ones are more likely to contact the medical organization directly, and older respondents are more likely to consult online ($p = 0.002$; $r_s = 0,112$).

Respondents are quite active in using Internet resources for other medical purposes (Figure 2).

Most often, the capabilities of the modern "digital space" are used to self-evaluate the state of health. The most popular answer was once every 3-4 months. Most respondents trust a diagnosis made by a specialist and rarely check it with Internet data. In accordance with the indicated frequency of doctor visits in a medical organization, patients "check" the prescriptions of drugs - once every 3-4 months, which proves the demand and availability of pharmaceutical resources. Differences in the distribution of answers in three questions were statistically significant ($p = 0.001$). No significant correlation with age was detected. There was a reliable but not significant correlation with the sex of the respondent - women were more likely to use the Internet for self-reported health ($p = 0.001$; $r_s = 0,177$); "verification" of diagnosis ($p = 0.006$; $r_s = 0.099$) and drug prescriptions ($p = 0.009$; $r_s = 0,095$).

At the next stage of the questionnaire, respondents summarized their attitude to online consultations of a medical specialist (Figure 3).



* - $p < 0.05$ - differences in the distribution of respondents' responses are reliable

Fig. 2: Frequency of use of online resources (internet) for medical purposes

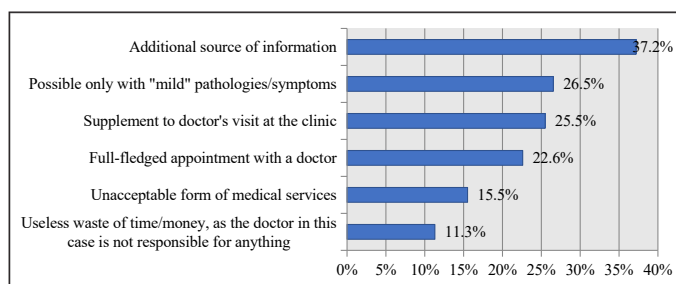


Fig. 3: Attitude to online consultations of a medical specialist

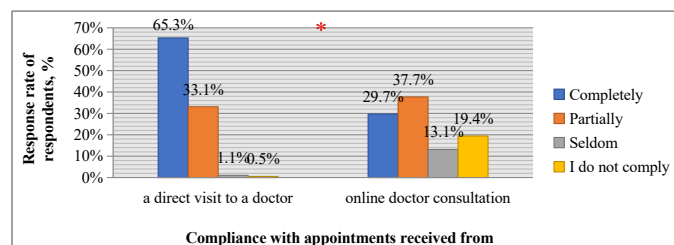
Only 23% of respondents consider this service a full-fledged reception. Most respondents (37%) noted it as an additional source of information, an addition to a direct visit (26%) and called it possible only with "mild" pathologies or symptoms (27%). There was also a reliable but not significant correlation with the sex and age of the patient: female ($p = 0.001$; $r_s = 0.102$) and young ($p = 0.001$; $r_s = 0.121$) more often answered about the futility and inadmissibility of such services.

In the next stage of the questionnaire, respondents assessed adherence to physician-prescribed therapy at different forms of medical care (Figure 4).

When assigned during a direct visit to the doctor, only 65% of respondents fully observe the appointments. 33% admitted partial compliance, which could lead to a decrease in treatment effectiveness. Significant differences were observed in the distribution of respondents' responses to compliance with online consultation. Only 30% respondents complied with the doctor's prescription completely and 38% partially. About 1/3 of respondents chose the option rarely or not at all. At the same time, there was a reliable correlation with the attitude to online consultation: the more negative it was (futility/inadmissibility), the less adherence the respondents indicated ($p = 0.001$; $r_s = 0,206$). There was a significant correlation of adherence in online consultation and sex - more pronounced in men ($p = 0.008$; $r_s = 0,096$).

Next, the underlying causes of non-compliance with physician appointments were assessed (Figure 5).

As the main factors of compliance, respondents indicated: forgetfulness (40%), the high cost of drugs (34%) and the lack of effect of prescribed treatment (25%). The least significant for respondents was the fear of developing side effects. More than 18% of respondents indicated a lack of confidence in the diagnosis of the specialist, however, according to the data obtained as a result of the questionnaire, the frequency of



* - $p < 0.05$ - differences in the distribution of respondents' responses are reliable

Fig. 4: Compliance with appointments received at a direct visit to a doctor or online doctor's consultation

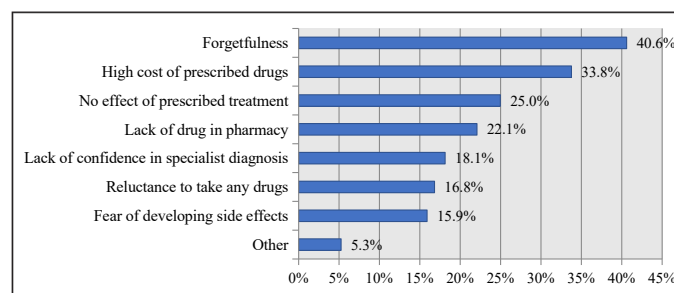


Fig. 5: Causes of low compliance of population

“verification” of it using modern Internet technologies is low (Figure 2).

DISCUSSION

The data obtained as a result of the questionnaire on the frequency of visits to medical organizations can be explained by the fact that the main activity in young people aged 18-25 years is studying in higher and secondary educational organizations, therefore, medical examinations are mandatory and free of charge for this category of respondents. Accordingly, if there are opportunities to receive medical care, directly at the place of “attachment,” young respondents choose this type of service. Another reason for the low demand for online consultations is probably their pay and a fairly high cost, the lack of possibility of obtaining compulsory health insurance under the policy, which shows a correlation with age. Of course, in many forums and sites of private clinics, it is often possible to ask a specialist directly for free, but as a rule, patients receive answers in this case with a delay, opinions are often not consistent between several doctors or are generalized with the recommendation of a face-to-face visit.

The high frequency of use of Internet resources for self-assessment of health and “verification” of prescribed drugs can be explained by the active popularization of medical and pharmaceutical information on the Internet, despite recommendations for its use only by specialists. Many resources are freely available where registration and authorization are not required. At the same time, the “verification” of diagnosis requires, as a rule, specialized knowledge, and skills, which is a difficulty for most respondents. The correlation with the female sex can be explained by a more responsible attitude to one’s own health and caring for all family members.

Based on the data obtained during the sociological survey, it can be concluded that the population does not fully perceive the service online, as consultations with a medical specialist. Most respondents evaluate it only as an addition to the main visit, the results obtained can certainly affect the degree of commitment to performing a doctor’s appointment. On the other hand, the results are demonstrating the impossibility of even partially replacing a direct visit to a medical organization with an online one, despite the difficult epidemiological situation and the repurposing of specialists.

Patient compliance is one of the most important components of the effectiveness of the therapy. The correlation of attitude to online consultation and adherence to the recommendations received in this form of service provision is logical, since if the patient does not consider it to be full, then he does not consider it mandatory to comply with the prescription. Relatively low rates of adherence, even with a direct visit to the doctor, demonstrate the need to determine the reasons for non-compliance with the appointment.

The distribution of respondents’ responses on the causes of low compliance demonstrates that the primary factor is patient forgetfulness. Despite the abundance of modern gadgets with the ability to install appropriate software, patients still miss taking drugs. The high cost of medicines has always negatively affected the observance of doctor’s appointments, which could be aggravated by the difficulty epidemiological and

economic situation in the pandemic, a possible loss of work. The lack of effect of prescribed drugs may result from the partial execution of doctor’s appointments of almost 1/3 of the surveyed population. Lack of confidence in specialist diagnosis, especially in the current state of laboratory and functional diagnostics, is more likely a psychological factor.

CONCLUSION

Despite the difficult epidemiological situation of 2020-2021 and the risk of infection, the majority (44%) of the respondents prefers to seek help directly from the medical organization once every 3-4 months, rarely using online consultations. However, modern Internet resources are used to self-assess health and “test” prescribed drugs once every 3-4 months (28%). Online consultation of a medical professional is more often perceived as an alternative source of information (37%) or an addition to a direct visit (26%), rather than a full-fledged medical service. More than a third of patients follow doctor’s appointments partially even after a direct visit to the doctor, and in the case of online consultations, compliance is reliably correlated with the attitude towards it. The main reason for low adherence, the population surveyed cites forgetfulness (41%), high cost (34%) and lack of effect of prescribed drugs (25%), which may be the result of insufficient compliance. Thus, contrary to the prospects, merits and active use of global digitalization opportunities, the use of online technologies to receive medical care remains limited and is often negatively perceived by the population.

Author’s contribution

Author contributed equally to the research work.

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