

# Medical information as a modern factor of self-medication and patient compliance

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## ABSTRACT

The availability of health information to populations lacking professional medical knowledge and skills may exacerbate global health challenges, such as self-medication and reduced patient compliance. Aims: analysis of the impact of medical information on self-medication and patient compliance. Materials and methods: questionnaire (n = 2888); 91.1% of respondents were from the Far Eastern Federal District. The statistical analysis used the Kendall rank correlation coefficient. Results: The results of the study demonstrate the relevance of the problem of self-medication, the correlation of its frequency with young age and female sex, and low compliance. Most often in digital sources, respondents are searching for information about the doctor, diagnosis, and clinic because of the desire to "hedge." For most respondents, the presence of negative information about the doctor is a reason to doubt the diagnosis or treatment, as well as choose another specialist. Conclusions: The patient's attitude to self-medication and compliance, as well as the factors that are forming them, are largely determined by the characteristics of the patient himself, as well as the attitude to the doctors and the content of information. It is necessary to monitor medical information on the Internet using identification systems.

**Keywords:** Self-medication, Compliance, Health information seeking, Patients' relationship to doctors

## Introduction

With the widespread use of digital technologies, it can result in problems of uncontrolled and unlimited access to medical information. Various aspects of the use of the Internet, digital technologies, and medical information are actively studied in modern research around the world, both to assess the prospects for use in medical specialist training and to improve patient health literacy. For example, at the Government Medical College in Lucknow in India, 69% of students used the Internet to study [1]. The effectiveness of a WeChat-based digital intervention

compared to metformin in women with polycystic ovary syndrome was investigated in China [2]. An educational website for patients with cancer and underlying autoimmune diseases is being developed and alpha-tested in the USA [3]. A multicenter cross-sectional Japan study of patients with systemic lupus erythematosus demonstrates that most respondents expressed confidence in doctors, while trust in websites and blogs and social networks was lower [4].

The problem of medical content in publicly available sources is also a frequent subject of modern research [5]. A multicenter study (Germany, USA, and Canada) evaluated the quality of content and the possibility of patients using 85 videos on the YouTube platform about sarcoidosis. Most videos present incomplete information [6]. Another study was devoted to videos about abortion; there is unreliable and biased information among these sources [7]. The results of another study of online Chinese-language videos on patient education for migraine treatment demonstrate that the videos were inadequate [8].

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The other side of the availability of medical information for patients is the risk of aggravation of global problems of health care, for example, antibiotic resistance. So, according to a prospective study, self-medication with antibiotics is widespread in Tanzania. 41-60% of antimicrobials were over-the-counter. Informal networks, friends, or neighbours, as well as personal experience, are indicated as the main sources of information [9]. Similar results were observed from a meta-analysis of 37 studies conducted in Iran. The overall prevalence of self-medication with oral and dental health was estimated at 60%. Analgesics (60%) and antibiotics (19%) were the most used drug categories [10-20]. Another issue in the availability of health information is the risk of disruption/alteration or rejection of physician-prescribed therapy regimens. That is, a decrease in patient adherence and, therefore, possibly, the effectiveness of therapy [21]. A meta-analysis database on mobile apps used to improve adherence to antiretroviral therapy demonstrated that most mHealth interventions did not meet the standard [22].

The issues under analysis are pertinent to the Russian Federation. A Russian study found that the prevalence of self-medication ranges from 39.3% to 75.7%. The opinions of friends and family, nursing advice, media advertisements, the Internet, and, less frequently, medical advice and recommendations were the primary sources of knowledge on medications [23]. According to the study, a negative attitude toward the health care system and a lack of funds or access to doctors are significant variables contributing to a high frequency of self-medication [24].

In addition, Russian researchers, as well as foreign ones, note the orientation of medical information to two main population groups—health workers and students [25] and non-professionals [26], the demand for information from the medical blogosphere [27] is assessed. A similar global health problem is the lack of uniform standards for verifying medical content, which creates difficulties in controlling the interaction of all links in the health care system [28], and in assessing the ethical and social consequences of online medical communication errors and forming perceptions of physician professionalism [29].

The Far Eastern Federal District is the largest in the Russian Federation (more than 40% of the territory), while the population density is only 1.17 people/km<sup>2</sup> (2020) [30]. With this size of the territory in 2023, the district occupied 3rd place in the number of doctors of all specialties per 10,000 people—55 people. The population per doctor was 182 and has not changed significantly since 2010. At the same time, the indicator of the number of hospital beds per 10,000 population decreased by 13% over 13 years and amounted to 92.5; respectively, the population per hospital bed increased to 108.1. For the outpatient clinic, the number of visits per shift per 10,000 people of the population (capacity) also increased by 40%, amounting to 359.6 in 2023 [31]. Thus, the availability of medical care decreases in the federal district. The situation can be complicated by the geographical distance of municipalities and, accordingly, the difficulties of visiting a doctor and regularly monitoring the state of health, while the availability of medical information does not have regional features. The factors presented in the literature review may also affect patients' behaviour regarding their own

health, tendency to self-medicate, and violation of medical prescriptions. Aims: analysis of the impact of medical information on self-medication and patient compliance.

## Materials and Methods

### *Sociological survey*

The questionnaire consisted of 4 blocks of questions: a social portrait of the respondent (gender, age, and region of residence); patient attitudes towards self-medication (frequency and causes); searching for medical information on the Internet (aspects and reasons of interest); and patient compliance and attitudes towards healthcare organizations and professionals. The survey was conducted using the Google form. The mailing was carried out through social networks and instant messengers (WhatsApp, and Telegram) with the consent of the respondent.

Compliance with ethical standards: study approval was provided by the Ethics Committee of the Far Eastern State Medical University (Minutes № 2, 2025).

Reliability was evaluated using Cronbach's Alpha ( $\alpha=0.72$ ) and the Guttman scale ( $\lambda = 0.69-0.73$ ). 30 parameters were included in the analysis. Thus, the reliability of the developed questionnaire is satisfactory for sociological research.

### *Study area*

The sample size was 2895 respondents (contacted). The response rate was 99%, and 2888 questionnaires were deemed eligible for processing (with a confidence probability of 95% and a share of the sign of 50%; the confidence interval was  $\pm 1.82$ ). 91.1% of respondents were from the Far Eastern Federal District (FEFD). Students from the medical university participated in the distribution of the questionnaires.

### *Statistical analysis*

Responses were coded using nominal and ordinal scales. Statistical data processing was performed using IBM SPSS 25. To determine the correlation, Kendall's tau-b and Spearman's rank correlation coefficient were used. Correlation was considered statistically significant at a significance level (two-tailed) of less than 0.05 ( $p<0.05$ ).

### *Published works*

The other portion of the study focused on the availability of medical care and pharmacy resources. Article citation: Soboleva MS, Dyachenko SV. The dynamics of patients' access to medical treatment in the Far East from 2005 to 2025. *J Adv Pharm Educ Res.* 2025; 15(3): 115-25. Soboleva M.S., Dyachenko, S.V. Pharmaceutical information as a factor influencing patient behavior when selecting a pharmacy organization and self-medication. *FARMAKOEKONOMIKA: Modern Pharmacoeconomics and Pharmacoepidemiology.* 2025;18(3):390-402. <https://doi.org/10.17749/2070-4909/farmakoeconomika>. 2025.329 The article's content is

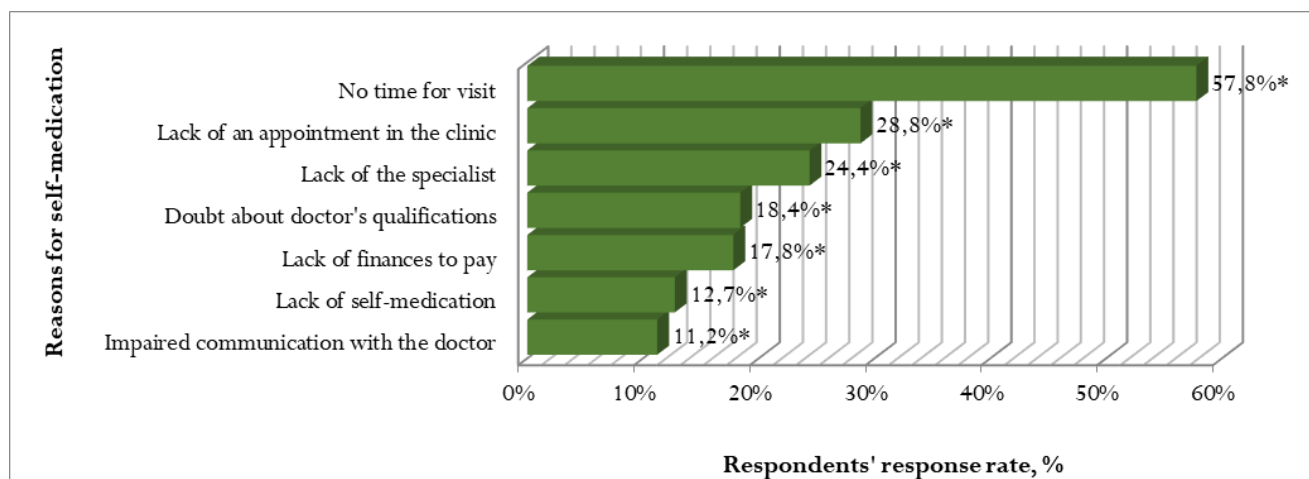
similar in the sections on materials and techniques, as well as respondent characteristics. The section results include previously unpublished data; there is no duplicate material in the publications.

## Results and Discussion

Characteristics of the respondents participating in the study: women - 68.9%. Age range: less than 20 years - 32%, 21–40 years - 42.3%, 41–60 years - 21.1%, over 61 - 4.6%.

The second set of questions focused on respondents' attitudes toward self-medication. Only 11.6% of respondents claimed to never use self-medication. 45.5% of respondents said they did it once in six months to a year. The fact that 23.8% of respondents use self-medication frequently (once every 2-3 months), while 19.0% do so on a regular basis, confirms the relevance of the topic under investigation. As a result, despite the potential implications, more than 40% of patients choose to treat themselves.

The distribution of respondents' answers regarding the reasons for self-medication is presented in **Figure 1**.



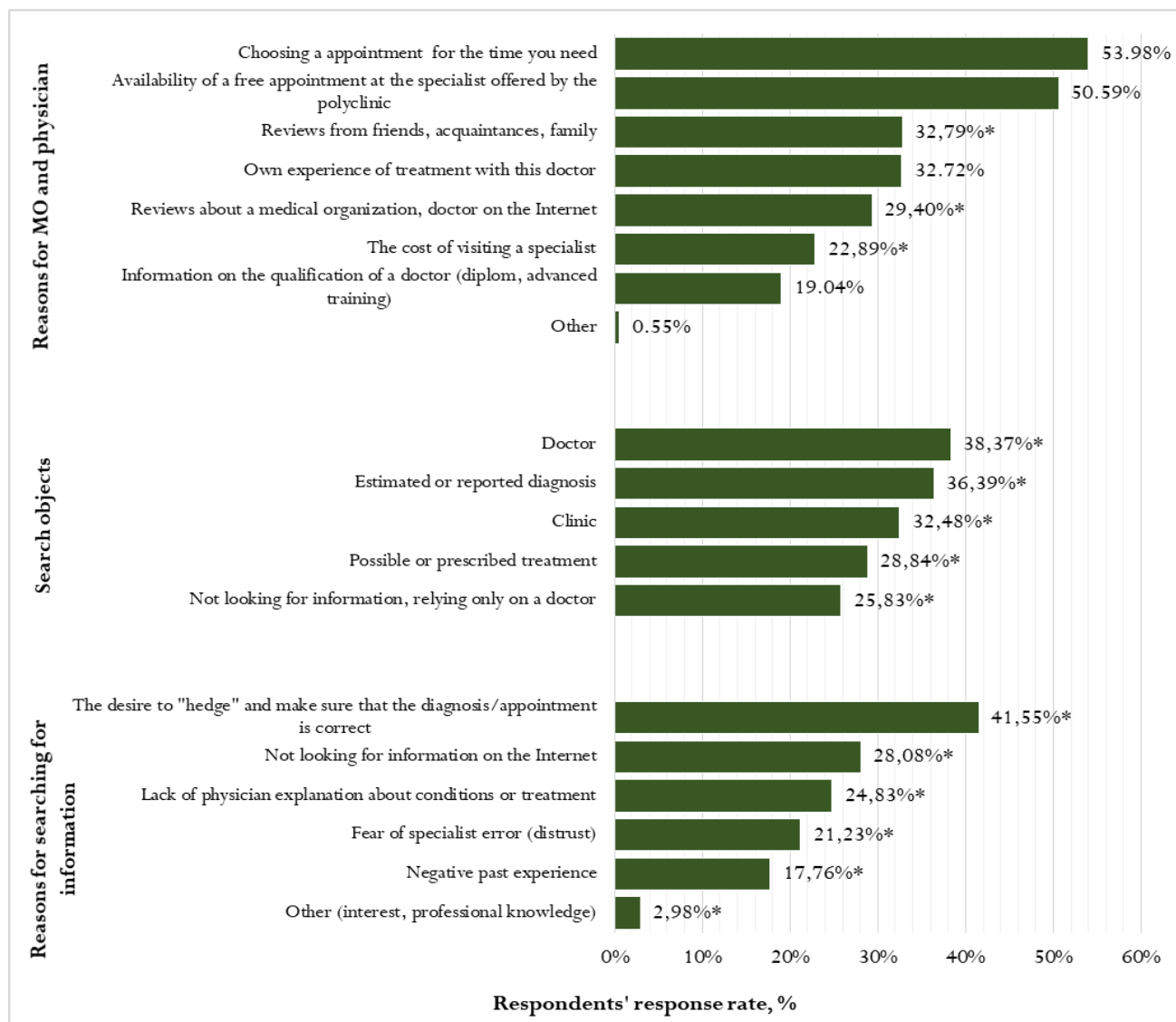
**Figure 1.** Reasons for self-medication indicated by respondents

\*  $p < 0,05$  - the correlation with the frequency of self- medication of patients is significant

The majority of respondents chose the lack of time to visit a doctor as the main factor, and about a quarter of the respondents indicated the lack of an appointment at the clinic and the lack of the right specialist. For all study factors, a significant correlation was observed ( $p = 0.001$ ,  $r_s < 0.3$  - weak) with a high frequency of self-medication. The frequency of self-medication correlated with age and gender ( $p = 0.001$ ). More often, women and younger respondents were treated independently. In the case of the answer—I do not self-medicate at all—the correlation was

significant ( $p = 0.001$ ) and negative ( $r_s = -0.496$  - moderate), that is, men.

The following section is the main one in this study. It is devoted to the influence of modern sources of information, primarily digital, on self-medication, as well as attitudes towards specialists in general. The distribution of responses about factors that guided their choice of MO, their search objects, and reasons is presented in **Figure 2**.



**Figure 2.** Distribution of respondents' responses about health information retrieval

\*  $p < 0,05$  - the correlation with the frequency of self-medication of patients is significant

The main criteria for selecting MO for patients are the availability of an appointment at the right time and the availability of a free appointment with the proposed specialist. Feedback from friends, acquaintances, and relatives, as well as their own experience of treatment, is more common than information on the Internet. At the same time, factors correlating with self-medication are feedback from the social circle ( $p = 0.001$ ,  $rs < 0.3$  - weak) and on the Internet ( $p = 0.007$ ,  $rs < 0.3$  - weak), as well as the cost of visiting a specialist ( $p = 0.001$ ,  $rs < 0.3$  - weak).

There was also a correlation with gender. The free appointment with the proposed specialist, as a factor for choosing MO, correlates with the male gender ( $p = 0.022$ ,  $rs < 0.3$  - weak), and the remaining factors presented in **Figure 2** (except for "other") correlate with the female ( $p < 0.023$ ,  $rs < 0.3$  - weak). Factors correlating with younger age were free appointments with the proposed specialist, cost of the visit, appointment at the right time, online reviews, and specialist qualifications ( $p < 0.002$ ,  $rs < 0.3$  - weak).

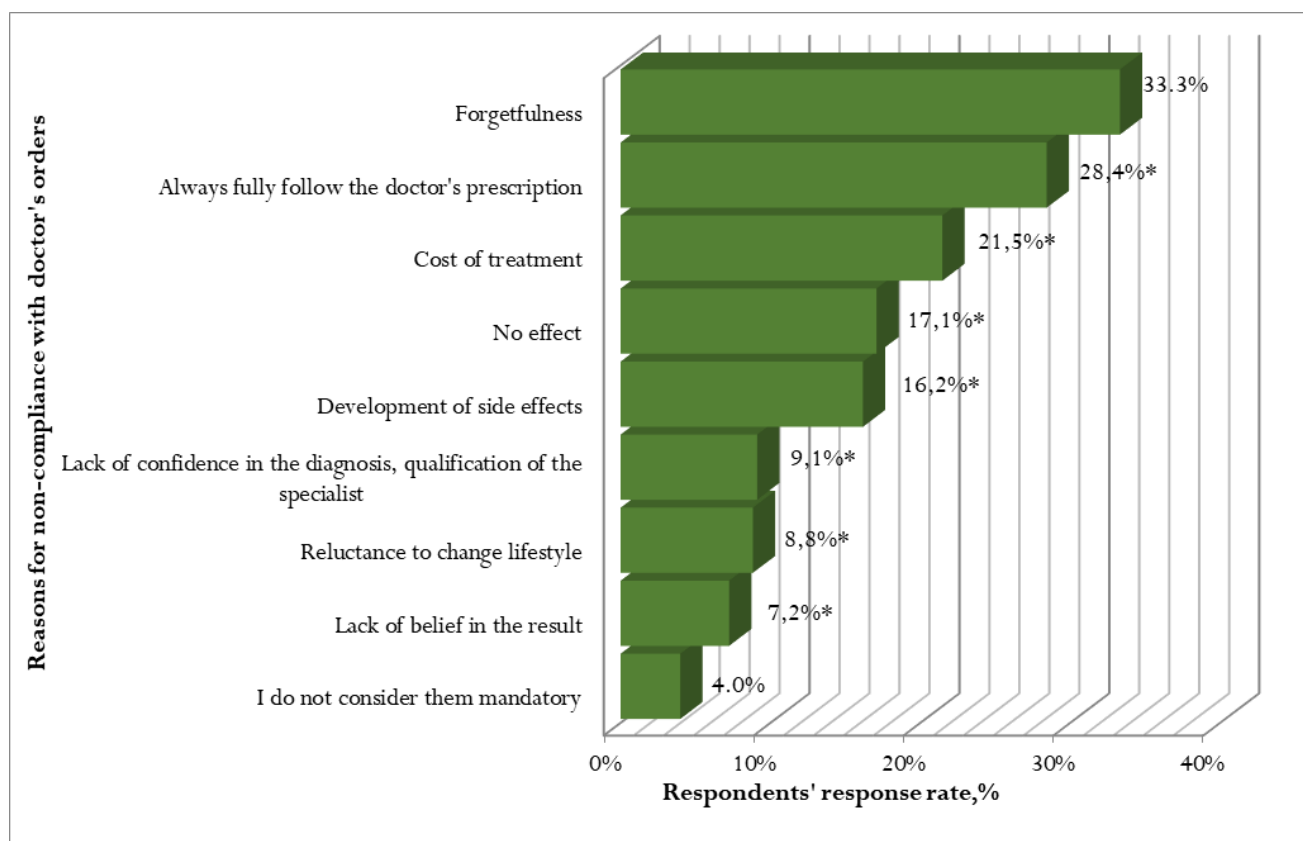
The most common is a search on the Internet for information about a doctor and a clinic, as well as a diagnosis. About a quarter of respondents rely only on a doctor and do not seek information. The selection of all these information retrieval objects also correlates with self-medication ( $p < 0.029$ ,  $rs < 0.3$  - weak). More often women are interested in information about the doctor, diagnosis, and treatment ( $p = 0.001$ ,  $rs < 0.3$  - weak), and younger respondents are interested in information about the clinic ( $p = 0.001$ ,  $rs < 0.3$  - weak). More often, men of older age do not search for information ( $p = 0.001$ ,  $rs < 0.3$  - weak). At the same time, the majority of respondents cite a specialist's "hedge" as a factor, while a quarter cite a medical worker's lack of explanations. Every fifth respondent lacks trust in doctors or has had an unpleasant encounter in the past. All reasons for searching for information (except "not looking" - negative and "other") have an association with self-medication ( $p = 0.001$ ,  $rs < 0.3$  - weak). Women and younger respondents were more likely to choose fear of error ( $p < 0.025$ ,  $rs < 0.3$ , weak). The female gender is associated with the urge to "hedge" and lack of explanation from healthcare professionals ( $p = 0.001$ ,  $rs < 0.3$  -

weak). Male and older patients were more likely to report a lack of search and information ( $p = 0.001$ ,  $r_s < 0.3$ , weak).

One of the most important factors is patient compliance. Only 40% of the patients surveyed always fully fulfill their doctor's appointments. 44% performed in most cases but sometimes allowed themselves to skip, replace, not treat, or refuse treatment, and 12% noted frequent skips, replacements, not treating, or refusal of treatment. 4% of respondents rarely fulfilled or did not fulfill the doctor's prescription at all and were

then treated most often on their own. High adherence was significantly correlated with older age ( $p = 0.003$ ,  $r_s < 0.3$  - weak), as well as the frequency of self-medication ( $p = 0.00$ ,  $r_s > -0.3$  - weak, negative). That is, patients who are more prone to self-medication more often violate the doctor's recommendations.

The distribution of respondents' responses on the cause of physician recommendation violations is presented in **Figure 3**.

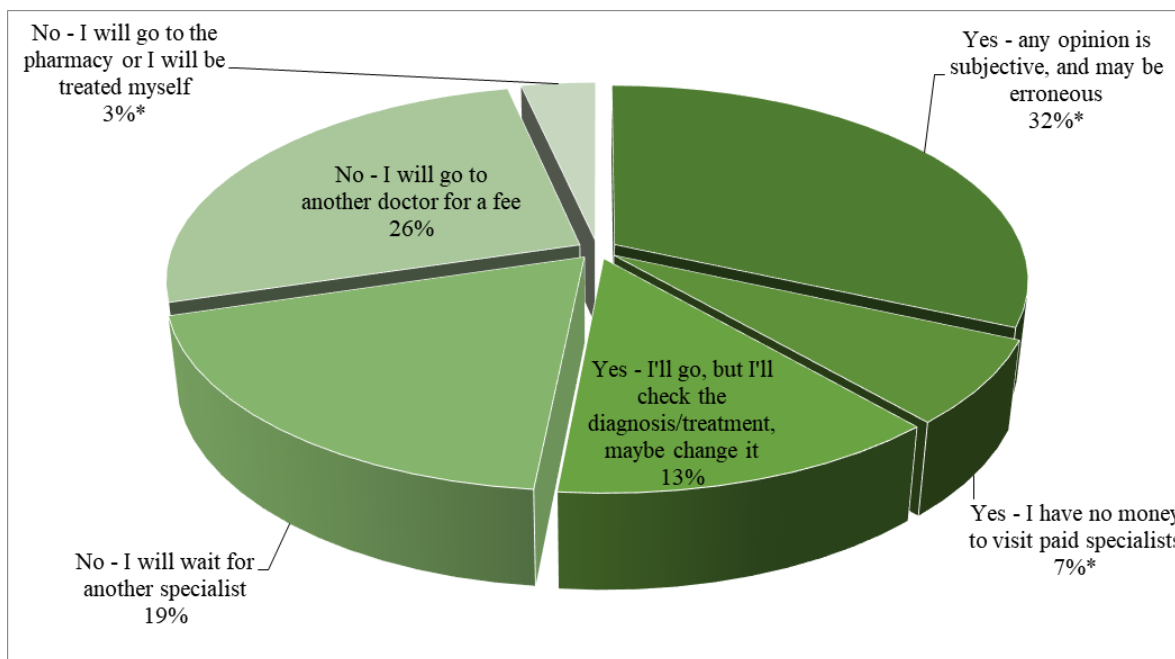


**Figure 3.** Reasons for non-compliance with medical appointments given by respondent  
 $p < 0,05$  - the correlation with the frequency of self-medication of patients is significant

The most common reason for non-fulfillment of doctor's appointments is the forgetfulness of the patient. Lack of therapy effects and side effects were also common causes. The frequency of most of the reasons presented correlated with a high frequency of self-medication (except for the answers "forgetfulness" and "I do not consider them mandatory") ( $p < 0.002$ ,  $r_s < 0.3$  - weak). The correlation with the male gender and young age of the respondents was observed when assessing the reasons "I do not

consider them mandatory" as well as "unwillingness to change the lifestyle." Women more often indicated the development of side effects ( $p = 0.001$ ,  $r_s < 0.3$  - weak); younger respondents indicated forgetfulness ( $p = 0.008$ ,  $r_s < 0.3$  - weak). Women and older respondents were more likely to fully perform ( $p = 0.001$ ,  $r_s < 0.3$  - weak).

Generalizing questions about the impact of information on patients is presented in **Figure 4**.



**Figure 4.** Respondents' opinion on actions in case of negative information about the doctor

\*  $p < 0,05$  - the correlation with the frequency of self-medication of patients is significant

More than 40% of respondents will take this information into account and go to see another specialist, including for a fee. For 13%, the presence of negative information is a reason to check the diagnosis/treatment and, possibly, change it. The frequency of self-medication among respondents who go to this doctor, even in the presence of negative information, was less frequent, and among those who do not have money for paid specialists or go to the pharmacy, it was higher ( $p = 0.001$ ,  $r_s < 0.3$  - weak). Men more often choose answers about the subjectivity of someone else's opinion and the lack of money for paid specialists, and women, that they would prefer to go to another doctor for a fee ( $p = 0.001$ ,  $r_s < 0.3$  - weak). Young respondents were more likely to report a lack of money to visit paid specialists ( $p = 0.007$ ,  $r_s < 0.3$  - weak).

The final question was to describe the relationship with the medical doctor. 59.2% of respondents believe that medical labor

is honorable and worthy of trust and respect, while 25.5% are neutral. "I perceive it like any other specialist or employee"; 7.5% simply perceive it as a regular area of service, and only 4.5% are negative, thinking medical labor an overrated society (too much attention is paid to the disadvantage of others). 3.4% believe that as the Internet, artificial intelligence, and neural networks become more prevalent, the demand for doctors will decline dramatically. Positive attitudes toward doctors were linked to lower self-medication rates ( $p = 0.004$ ,  $r_s < 0.3$  - weak) and younger age ( $p = 0.016$ ,  $r_s < 0.3$  - weak).

Analysis of patient compliance factors revealed similar data with the frequency of self-medication. That is, patients more prone to self-medication more often changed or did not follow the recommendations of a medical specialist. A reliable correlation of compliance factors is presented in **Tables 1-3**.

**Table 1. Significant compliance factors (negative)**

Factor	Value (two-hundred.) Kendall's tau-b
No time for visit	0,007
Doubt about doctor's qualifications	0,001
Impaired communication with the doctor	0,001
Lack of finances to pay for medical care	0,001
Cost of visit	0,001
Search for diagnosis information	0,001
Search for treatment information	0,001
Fear of error	0,001
Not explained by a specialist	0,001
The desire to "hedge"	0,001
Reluctance to change lifestyle	0,001
No treatment effect	0,001
Development of side effects	0,001
Cost of therapy	0,001

Distrust of the doctor	0,001
Lack of belief in the result	0,001
Forgetfulness	0,001
Do not consider them mandatory	0,001

Table 2. Significant compliance factors (positive)

Factor	Value (two-hundred.) Kendall's tau-b
Lack of self-medication	0,001
Free write-to time	0,008
Finding clinic information	0,038
No search for information on the Internet	0,001
Positive attitude towards the doctor	0,001

Table 3. Significant compliance factors of patient behavior

Factor	Pos. or neg.	Value (two-hundred.) Kendall's tau-b
Visiting a doctor despite negative information (the possibility of subjectivity and the fallacy of someone else's opinion)	Pos.	0,001
Visiting a doctor in the presence of negative information, due to the lack of money to visit paid specialists	Neg.	0,001
Visiting the doctor in the presence of negative information, but "rechecking" the diagnosis/treatment, it can be changed	Neg.	0,001
Refusal to visit if there is negative information, waiting for another specialist	Neg.	0,028
Refusal to visit in the presence of negative information, visit of another specialist for a fee	Pos.	0,003
Refusal to visit in the presence of negative information, in favor of a visit to the pharmacy or self-medication	Neg.	0,001

Based on the received distribution of respondents' answers, we can conclude that the main reasons for self-medication are lack of time, records, and specialists. The data obtained can be explained by the "hard" work schedule of the respondents, the frequency of work on a rotational basis, especially in the northern territories, and the inability to "adjust" to the proposed date and time. The lack of appointments and specialists remain one of the main problems of health systems, despite the Far Eastern Federal District's 3rd place in the Russian Federation in terms of the number of doctors of all specialties per 10,000 people [30-34]. The current situation with the availability of medical care can be explained by the fact that medical specialists, especially "narrow" ones, are often concentrated in large cities, and in other municipalities, especially those significantly remote from the capital of the subject, the problem of the lack of medical personnel is especially urgent.

The active search for information about diagnosis and treatment can be explained by free access to medical information and the interest of patients. However, all these parameters, also distrust of the doctor, the presence of negative experience, and the absence of explanations from the medical specialist correlate, with a higher frequency of self-medication. The study of medical information by the patient (without specialized knowledge and education) may lead to doubt in the diagnosis and recommendations of the doctor or a change/refusal of the prescribed treatment.

The data obtained on the behavior of patients in the presence of negative information, as well as the opinion of the medical profession, prove the relevance of the problem under study [35-

40]. It demonstrates the need to monitor the reliability of information in available sources. Respondents who do not trust someone else's subjective judgment, as well as a more positive opinion about the doctor, are less inclined to self-medication. The similarity of factors that form the patient's tendency to self-medication, as well as adherence to the therapy prescribed by a medical specialist, proves the possibility of a unified approach to solving two pressing medical problems.

The results of the study are practically significant, despite the fact that the correlation coefficients obtained in this study in most cases were low. The current situation can be explained by generally low  $r_s$  values in large sociological studies, as well as the need to consider not only the strength of the connection and significance but also the sample size; respectively, apply critical values and transformed intervals of the correlation coefficient. Then the values of  $r_s \leq 0.2$  at the significance level of 0.05 can be considered a moderate correlation [41].

## Conclusion

The patient's attitude to self-medication and compliance, as well as the factors that form them, is largely determined by the characteristics of the patient himself (gender and age) and the attitude of respondents to doctors. The factor of medical information, including in digital sources and on the Internet, is associated with both positive and negative consequences. Convenience of use by remote technologies or the ability to obtain the necessary information at any time, but the lack of full control over the reliability of the content, as well as its impact on

the patient's behaviour, in terms of self-medication, the choice of a medical organization or specialist, and the implementation of doctor recommendations.

Accordingly, monitoring medical information on the Internet and the use of identification systems with the introduction of personal responsibility when posting and checking it, is a prerequisite for the functioning of medical organizations in the modern world, as well as sites containing such data. To form an objective picture and the possibility of using the Internet as a feedback channel with patients, the ban on the provision of marketing services is relevant ("cheating reviews and ratings," unreasonable filtering and removal of negative information, formation of a positive reputation, etc.) medical organizations with various Internet resources, including with the involvement of third-party organizations, as well as the use of various bonuses and discounts for patients for publishing their preferred feedback and opinions about the organization.

The data obtained may also be in demand for the creation of social or thematic advertising of MO of various forms of ownership, aimed at a specific group of the population (women, youth, etc.), as well as the formation of a positive image and an appropriate attitude towards the health care system among the population.

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