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# The Analysis of the Context of Digital Access to Healthcare in Russia

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**Abstract:** Digital accessibility is one of the key principles of modern healthcare. The Internet has become a main tool to both communicate and engage patients. This study aims to analyze adults' preferences on health information resources and the utilization of digital healthcare tools in Russia. The data were collected from the online survey conducted in August-September 2020. The association of factors with individual preferences was analyzed using Pearson's $\chi^2$ with Holm–Bonferroni correction. The sample included 1319 respondents' submissions. The most prioritized activity on the Internet among all the respondents was social media 64.1% (95% CI 61.4–66.6%). Females, those who are more educated, and more active Internet users were more likely to use all available sources to gather health information. Almost one-half of the respondents (48.0%; 95% CI 45.3–50.7%) reported that they did not use any digital tools to manage their medical appointments. Smartphones were more likely to be used by younger and more active Internet users, while personal computers were prioritized as the preferable device to access the Internet by males and older adults. The study revealed that both public health authorities and health providers must provide a wider range of information and digital interaction experiences appropriate to the needs and preferences of patients.

**Keywords:** health; communications; digital; accessibility; internet; social; website

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## 1. Introduction

Accessibility is internationally recognized as a key principle of the healthcare system [1]. There is a consensus among public health scientists on the healthcare access framework of Levesque et al. (2013), which conceptualized accessibility as five dimensions (approachability, acceptability, availability and accommodation, affordability, and appropriateness), corresponding to five personal abilities determining access (ability to perceive, ability to seek, ability to reach, ability to pay, and ability to engage) [2,3]. These dimensions and abilities, along with their interrelation, may be considered as the framework of a patient journey: steps that patients take to access care, undergo treatment, and manage their health.

A great deal of previous research into healthcare access has focused on barriers arising in the patient journey, highlighting common disparities in healthcare access among groups and populations. Data from several studies and reviews suggest grouping barriers into personal (age, gender, behavior, education, socioeconomic, and health literacy levels), institutional (lack of qualified healthcare services providers and educators), and contextual (lack of infrastructure, fractured healthcare, residential and community problems) categories [4–9]. It has conclusively been shown that personal barriers are the most common for most previously conducted studies' participants [10–13]. This is in line with the importance of personal abilities of Levesque's framework that is limited not only to financial and mobility aspects but also to behavior, beliefs, health literacy, and access to information [2]. Butkus et al. (2020) noted the importance of health literacy and accessible health information for healthcare access, emphasizing the Internet as one of the primary

sources of health information for patients [14]. Many recent studies have supported the growing role of digital technologies in healthcare and health communication [15–17].

The growing availability of the Internet among the world population results in an increasing number of patients using the Internet as a source of health information and as a tool to interact with healthcare providers [18,19]. It brings ample opportunities to communicate with patients and provides broader accessibility to information, especially for patients who are limited in their information-seeking abilities or less likely to use personal interaction with their caregivers to find health information [20–22]. The health information widely presented over the Internet positively influences healthcare access, patient empowerment, and engagement in the decision-making process despite their age, gender, income, or other demographic and social factors [23–25]. Clinicians' and hospitals' ratings and patient feedback play a significant role in the provider choice preferences [26,27]. Accessible health information on the Internet opens the door for patients' personal ability improvement through the improvement of their health literacy and education on their conditions [28,29]. Patients are able to find information regarding their health and well-being, as well as advice on how to maintain and improve their health. By having better access to this information, individuals are able to develop personal responsibilities and make better informed decisions about their health and well-being, leading to improved health promotion and prevention. This is supported by the findings of Li et al. (2020), which showed a positive relationship between receiving health information online and preventive behavior during the COVID-19 pandemic in the United States [30]. Another benefit of digital access to healthcare services is that it makes it easier for patients to communicate with their healthcare providers [31].

Eighty percent of Russian citizens have Internet access [32]. This is more than the global Internet penetration rate (66.3%) but less than the rate in developed countries, where 88.3% of users have access to the Internet. However, the International Telecommunication Union reported the digital divide between urban and rural populations. The number of Internet users is 1.95 times lower among the rural population globally, reaching the largest relative difference of 3.62 times in the least developed countries [33]. The difference in Internet usage between urban and rural populations in Russia is approximately 9% (85.5% in urban vs. 74.6% in rural areas) [34]. Quinton et al. (2021) showed the relationship between Internet utilization for health purposes and broadband availability in rural areas [35]. According to the Russian Federal State Statistics Service (2022), 64.6% of rural households that did not use the Internet reported that it is not necessary for them, 35.0% referred to the unavailability of broadband or the high cost of Internet access, and 32.2% referred to their low computer and digital literacy [34]. The difference between urban and rural areas may be related to the lower socioeconomic status of rural residents, a factor found in many recent studies. Socioeconomic status tends to correlate positively with higher educational attainment and, thus, higher Internet use for health-related purposes [36–39].

Hunsaker and Hargittai (2018) noted that older people, traditionally considered less active users of the Internet, increasingly prefer to use the capabilities of the World Wide Web to find information regarding health, healthcare providers, and their services [40]. However, Voronin and Kuryacheva (2018) showed that the proportion of Russian Internet users dramatically drops from 26.1% in the 50-year-old group to 1.6% in the 80-year-old group [41]. This is consistent with international studies showing that older patients underutilized both electronic devices and the Internet for health-related activities. The most dramatic decrease in the proportion of Internet users was observed after the age of 50–60 years [42,43], which may be related to lower computer and digital literacy in this age group [40]. The prevalence of chronic diseases is also higher in patients from this group. Therefore, it is important to consider health-related factors when examining digital access to healthcare in the population. Mahajan et al. (2021) and Schmidt et al. (2021) demonstrated counterintuitive relationship between better state of health and more active health information seeking and use of digital health technologies [36,37], highlighting

the critical importance of overcoming barriers to engaging populations most in need of healthcare services.

Previous research in America, Europe, and Asia has found that gender, in addition to age, is associated with the use of electronic devices and the Internet for health information. Females have been shown to be more active health information seekers than males [36,37,39,43]. However, Mistry et al. (2022) showed that females are less likely to use virtual health services compared with males [38].

The health information search constitutes 4% of all searches on the popular Russian search engine, Yandex. Sixteen percent of health searches are related to health facilities and clinicians [44]. Twenty-eight percent of patients use health facility websites to make an appointment, 59% of them use the Internet to find information about symptoms and diseases, 47% to check feedback, and 31% to find information about clinicians (specialization, education, qualification, and experience) [45]. As for the global picture, Google health-related searches constitute approximately 7% (70,000 searches every minute) of the total amount of searches, according to a Google Health representative [46]. A number of studies have emphasized the rapidly growing role of social media for seeking health information [47–49]. Seventy-six percent of Russian citizens use the Internet for social media [34]. The prevalence of social media platforms in Russia has increased the importance of digital communication for health information, as it has become a popular way to share information and seek advice; however, data on health-related activities and preferences on social media usage in Russia are lacking. This also applies to the role of other popular web-based healthcare-related platforms on the Internet: testimonial aggregators and clinician directories.

The Russian healthcare system provides care to citizens free of direct charges within the Compulsory Medical Insurance (CMI). There are various digital tools to manage appointments and health records available for patients both at federal (Gosuslugi digital services) and regional (e.g., EMIAS for Moscow city) levels. Federal laws on healthcare services and CMI, along with the Orders of the Ministry of Healthcare of the Russian Federation, provide policies on health information mandatory for publication on healthcare providers' websites [50].

According to the Sustainable Development Goal (SDG) 3 "Ensure healthy lives and promote well-being for all at all ages" of the United Nations 2030 Agenda [51], there is a need to develop healthcare systems globally and regionally to prevent premature mortality, improve universal access to healthcare, and engage patients of all ages in healthcare activities. Rice and Sara (2019) suggested considering Internet access as one of the modern social determinants of health [52]. Thus, the digital divide, especially the dramatic difference between urban and rural populations, emphasizes the demand to take actions not only in accordance with SDG 3 but also SDG 11 "Make cities and human settlements inclusive, safe, resilient and sustainable" to support links among urban, peri-urban, and rural areas by strengthening national and regional development planning to provide equal access to healthcare, including digital access to healthcare services and health information.

The importance of digital access was stressed during the COVID-19 pandemics. In 2020, in order to combat the threat of a novel coronavirus infection, the Russian Ministry of Health established the Federal Remote Consultation Center of Anesthesiology and Resuscitation for adults based at Sechenov University to provide information on the diagnostics and treatment of COVID-19 and associated pneumonia. A team of leading specialists from the fields of intensive care medicine, pulmonology, virology, and telemedicine technologies counseled regional clinicians on the treatment of COVID-19 24 h a day. According to the results of the center's work, 27,306 consultations were conducted in 2020 and 11,380 consultations in 2021. Many healthcare facilities, including those of Sechenov University, were reorganized to treat infected patients and had to provide valuable and reliable information on the novel coronavirus infection prevention, diagnostics, treatment, and rehabilitation measures mainly online. However, Russian legislation lacks an established policy on health information quality and reliability [53].

Little is known about the context of digital communication and it is not clear which factors influence the Russian population's ability to perceive and seek health information, including that regarding the healthcare system and providers. This indicates a need to understand the perceptions of contextual aspects of digital access to healthcare that exist among Russian citizens in order to adapt digital tools to meet the needs of sociodemographic groups for better access to healthcare. Given the complexity and variability of context of digital access, the findings are expected to make an important contribution to the field of digital health communication and healthcare accessibility in developing countries, particularly in the Commonwealth of Independent States.

The specific objective of this study was to analyze Russian adults' preferences on health information resources and the utilization of digital healthcare tools. The study used a web-based survey to collect data from a sample of Russian adults. The survey asked questions about their preferences on Internet use, health information resources, the utilization of digital healthcare tools and electronic devices, and the primary factors of healthcare provider choice. Independent variables selected for analysis were divided into demographic (gender, age, place of residence), social (education level, average daily Internet use time), and health-related (number of chronic diseases, number of medical visits in the past year) dimensions. Preferences of health information resources can determine the type of information that is accessed, possible ways to engage patients in health behavior and the health-decision-making process. The finding of this study can be used by healthcare providers to customize digital healthcare services and create digital resources for patients, including personalized information and patient-oriented content. This can help to engage patients in the decision-making process about their health, such as providing relevant and personalized health advice and promoting behavior change. In addition, findings of this study can be used to design health information campaigns. Finally, this can help to inform healthcare policy and strategies, such as requirements for health information resources that are responsive to the needs of different groups of the population. The research had no external funding.

## 2. Materials and Methods

The data for this study were collected from the online survey conducted in August-September 2020. The target population of the survey was Russian Federation adults who at least rarely use the Internet. The advantage of web-based surveys is that they are simple to deliver.

The survey design was evaluated for the best conversion rate during the preliminary stage. The pilot study showed that the question related to participants' income was the one affecting the conversion rate dramatically (likely due to economic disturbances and population anxiousness and discomfort in answering such a question during the first waves of COVID-19); thus, it was excluded from the final survey.

Respondents of the sociological study were recruited using the methodology of non-probability selection (self-selection) of the "river-sampling" type [54] through a targeted banner advertising campaign carried out by MyTarget advertising service. Recruitment was carried out through the demonstration of advertisements to a specific target audience of web resources that are popular among the Russian population. These include the social media Vkontakte (total audience of 72 million users) and Odnoklassniki (total audience of 70 million users), the information portal Mail.ru (total audience of 54.9 million users), and the trading platform Youla (total audience of 33 million users). The selection of the desired audience was based on the targeting settings by location (Russian Federation) and age (from 18 to 90 years). Respondents were divided into three age groups: 18–34 years old (young adults), 35–49 years old (middle-aged adults), and 50 years old and over (older adults). The participant recruitment was carried out until at least 500 questionnaire submissions were collected in each age group.

The actual study analyzed two sections of the survey. The study began with survey questions that asked participants to indicate basic information about the participant, in-

cluding age, gender, place of residence, education level, average daily Internet use time, number of chronic diseases, number of medical visits in the past year, and informed consent. The basic information represented the distribution of participants in three dimensions: demographic, social, and health. The questionnaire in the second section asked participants to complete multiple response questions that asked about main actions on the Internet, preferable devices to access the Internet, main factors of provider choice, main sources of health information, and main digital tools to manage appointments. In order to record only preferable elements, the number of possible answers to each multiple response question was limited to 3. The top section of the page contained the survey purpose description, a link to the privacy policy page, and the statements of participants' rights.

Prior to commencing the study, ethical clearance was sought from the Sechenov University Local Ethics Committee (minutes of the meeting N19-20 from 2 July 2020). The survey web page contained comprehensive information concerning the objectives of the survey, participants' rights, and privacy policy statements. All the completed questionnaires were checked to ensure informed consent and were prevented from submission if not given. To ensure the security of the connection, the web page provided data transmission by encrypted HTTPS connection. The gathered data was stored in the MySQL database and then transferred to SPSS for coding and further analysis.

The number of total questionnaire web page visitors was 31,085, 6.7% of whom were converted into participants. The initial sample contained 2090 completed submissions. The median time to complete was 428.5 s ($Q_1$–$Q_3$: 333–569 s). To increase the reliability of the measures, in accordance with Zhang and Conrad's (2014) recommendations [55] on web-based survey analysis, all the participants whose time to complete was less than 333 s ($Q_1$) were excluded from the final sample. Exclusion criteria also included the place of residence outside of the Russian Federation and age lower than 18 years.

Respondents under the age of 35 were included in the group of young people as defined in Clause 1, Article 2 of Federal Law No. 489-FZ of December 30, 2020 "On Youth Policy in the Russian Federation". Respondents from the age of 50 years old were included in the older age group since, according to previous studies on the Russian population, this is the age at which Internet activity declines [41]. Residential groups (urban, rural, and peri-urban, which include areas that are in transition from strictly rural to urban) were determined according to the Federal State Statistics Service materials as of 1 January 2020. Education levels were provided in accordance with Clauses 4 and 5, Article 10 of the Federal Law No. 273-FZ of December 29, 2012, "On Education in the Russian Federation".

To examine the association of demographic, social, and health groups with individual answers, we used contingency tables and the Pearson's $\chi^2$ with Holm–Bonferroni multiplicity correction. Individual values' pair-wise comparisons were limited to avoid excessive multiplicity. However, they were used reasonably to identify differences between individual groups when no factor association was shown. The statistical significance of differences was assumed to be at the confidence level of $p < 0.05$. All statistical analyses were carried out using IBM SPSS Statistics, version 24.

## 3. Results

The final sample included 1319 respondents' submissions, after exclusion criteria application. The median age of respondents was 40 years ($Q_1$–$Q_3$: 29–52 years) within a range from 18 (min) to 81 (max) years. The sample comprised 46.9% male and 53.1% female participants. Table 1 presents the distribution of the sample across demographic, social, and health groups.

As shown in Table 2, two-thirds of the participants (64.1%; 95% CI 61.4–66.6%) reported that they used the Internet to access social media. Relatively lower proportions were observed in the Internet usage for news (42.8%; 95% CI 40.2–45.5%) and entertainment (43.2%; 95% CI 40.6–45.9%) purposes.

**Table 1.** The distribution of study participants (n = 1319) across demographic, social, and health groups.

| Variable | Category | n (%) |
|---|---|---|
| Gender | Male | 618 (46.9%) |
| | Female | 701 (53.1%) |
| Age | 18–34 years | 485 (36.8%) |
| | 35–49 years | 444 (33.7%) |
| | 50 years or over | 390 (29.6%) |
| Place of residence | Urban | 1188 (90.1%) |
| | Rural | 113 (8.5%) |
| | Peri-urban | 18 (1.4%) |
| Education level | Basic general | 52 (3.9%) |
| | General secondary | 134 (10.2%) |
| | Secondary vocational | 563 (42.7%) |
| | Higher | 541 (41.0%) |
| | Post-graduate advanced | 29 (2.2%) |
| Average daily Internet use time | Less than 1 hour | 134 (10.2%) |
| | 1–2 h | 277 (21.0%) |
| | 3–4 h | 425 (32.2%) |
| | 5 h or more | 483 (36.6%) |
| Number of chronic diseases | None | 569 (43.1%) |
| | One | 445 (33.7%) |
| | 2 or more | 217 (16.5%) |
| | Uncertain | 88 (6.7%) |
| Number of medical visits in the past year | None | 301 (22.8%) |
| | 1–3 visits | 750 (56.9%) |
| | 4–6 visits | 183 (13.9%) |
| | 7 or more visits | 85 (6.4%) |

The most preferable devices for accessing the Internet were smartphones (69.7%; 95% CI 67.2–72.2%) and laptops (62.3%; 95% CI 59.7–64.9%). Almost one-half of participants preferred personal computer (45.3%; 95% CI 42.7–48.0%).

The study participants prioritized the qualification of staff (66.3%; 95% CI 63.8–68.9%) and other patients' testimonials (54.1%; 95 CL 51.4–56.8%) over other factors affecting their healthcare providers' choice. The location and price also had higher priority for over one-third of participants (38.4%; 95% CI 35.8–41.0% and 37.3%; 95% CI 34.7–39.9%, respectively).

The proportion of participants who reported the importance of search engines as a primary source of health information (61.2%; 95% CI 58.5–63.8%) was from two to three times higher than the proportion of those who reported any other source. Only a minority of respondents (18.5%; 95% CI 16.5–20.7%) prioritized social media as a preferable source of information despite its dominating proportion in Internet usage scenarios.

Approximately one-half of respondents reported no use of any digital tools to manage medical appointments (48.0%; 95% CI 45.3–50.7%). However, approximately one-third of the survey participants prioritized the usage of either federal portal Gosuslugi (34.2%; 95% CI 31.7–36.8%) or healthcare service providers' websites (35.0%; 95% CI 32.5–37.6%) to manage their medical appointments. What is interesting about the data in this table is that messengers were even slightly more popular than regional portals (14.0%; 95% CI 12.2–16.0% vs. 11.9%; 95% CI 10.2–13.7%, respectively).

Table 3 illustrates a significant association between individual answer prioritization (binary outcome) and factor groups. From the perspective of significant associations of factors and answers, the most factor-dependent categories are main actions on the Internet, preferences in health information sources, and preferences in digital tools to manage appointments. It is shown in Table 3 that factors of healthcare provider choice and preferences in devices to access the Internet were less factor-dependent.

**Table 2.** The distribution of answers in the sample (n = 1319).

| Variable | Category | n | n,% | 95% CI for n,% |
|---|---|---|---|---|
| Main actions on the Internet | Social media | 845 | 64.1% | 61.4–66.6% |
| | News | 565 | 42.8% | 40.2–45.5% |
| | Entertainment | 570 | 43.2% | 40.6–45.9% |
| | Education | 355 | 26.9% | 24.6–29.4% |
| | Work | 442 | 33.5% | 31.0–36.1% |
| | Consumerism | 427 | 32.4% | 29.9–34.9% |
| | Games | 264 | 20.0% | 17.9–22.2% |
| | Uncertain | 29 | 2.2% | 1.5–3.1% |
| Primary sources of health information | Social media | 244 | 18.5% | 16.5–20.7% |
| | Search engines | 807 | 61.2% | 58.5–63.8% |
| | Review aggregators | 344 | 26.1% | 23.8–28.5% |
| | Clinician directories | 286 | 21.7% | 19.5–24.0% |
| | Did not use | 336 | 25.5% | 23.2–27.9% |
| | Uncertain | 70 | 5.3% | 4.2–6.6% |
| Main digital tools to manage appointments | Federal portal (Gosuslugi) | 451 | 34.2% | 31.7–36.8% |
| | Regional portal (e.g., EMIAS) | 157 | 11.9% | 10.2–13.7% |
| | Healthcare providers' websites | 462 | 35.0% | 32.5–37.6% |
| | Healthcare providers' smartphone application | 80 | 6.1% | 4.9–7.5% |
| | Messengers | 185 | 14.0% | 12.2–16.0% |
| | Did not use | 633 | 48.0% | 45.3–50.7% |
| Primary factors of provider choice | Location | 506 | 38.4% | 35.8–41.0% |
| | Price | 492 | 37.3% | 34.7–39.9% |
| | Qualification | 875 | 66.3% | 63.8–68.9% |
| | Testimonials | 714 | 54.1% | 51.4–56.8% |
| | Brand | 239 | 18.1% | 16.1–20.3% |
| | Uncertain | 110 | 8.3% | 6.9–9.9% |
| Preferable device to access the Internet | PC | 598 | 45.3% | 42.7–48.0% |
| | Laptop | 822 | 62.3% | 59.7–64.9% |
| | Tablet | 476 | 36.1% | 33.5–38.7% |
| | Smartphone | 920 | 69.7% | 67.2–72.2% |
| | Smart TV/Gaming console | 71 | 5.4% | 4.3–6.7% |
| | Uncertain | 19 | 1.4% | 0.9–2.2% |

Among demographic variables, the major role was played by age. It was associated with all main actions on the Internet, the majority of primary sources of health information and the utilization of digital tools to manage appointments. Gender explained the general usage of social media but was not associated with its usage specifically for health-related purposes. As for social factors, education determined not only main actions on the Internet, preferable sources of health information, and digital tools but also was the most significant factor associated with reasons for choosing a healthcare services provider. However, the association of this factor with preferable devices was not significant. The average daily Internet use time was also largely associated with the majority of dependent variables, except for factors of provider choice. Overall, these findings suggest that sociodemographic variables play an important role in how people use the Internet for health information and use digital tools for health-related purposes. These findings point to the importance for healthcare providers to consider the age, gender, and education of their patients when attempting to engage them digitally.

**Table 3.** Significant results of application of Pearson's $\chi^2$ test with Holm–Bonferroni multiplicity correction for factor groups and individual answers prioritization.

| Variable | Category | Gender | Age | Residence | Education | Internet Use | Chronic Diseases | Medical Visits |
|---|---|---|---|---|---|---|---|---|
| Main actions on the Internet | Social media | 0.001 | <0.001 | | 0.003 | <0.001 | <0.001 | <0.001 |
| | News | | <0.001 | | <0.001 | <0.001 | <0.001 | <0.001 |
| | Entertainment | | <0.001 | | <0.001 | <0.001 | <0.001 | <0.001 |
| | Education | | <0.001 | | | <0.001 | 0.001 | |
| | Work | | <0.001 | | <0.001 | | <0.001 | |
| | Consumerism | <0.001 | | | | | | |
| | Games | <0.001 | <0.001 | | <0.001 | <0.001 | 0.001 | <0.001 |
| | Uncertain | | <0.001 | | | <0.001 | <0.001 | 0.009 |
| Primary sources of health information | Social media | | <0.001 | | | <0.001 | | |
| | Search engines | <0.001 | 0.002 | 0.010 | <0.001 | <0.001 | | 0.004 |
| | Review aggregators | 0.001 | 0.005 | | <0.001 | <0.001 | | |
| | Clinician directories | | | | 0.001 | 0.001 | | 0.007 |
| | Did not use | <0.001 | 0.003 | 0.004 | <0.001 | <0.001 | <0.001 | <0.001 |
| | Uncertain | | | | | | 0.005 | |
| Main digital tools to manage appointments | Federal portal (Gosuslugi) | | 0.009 | | <0.001 | <0.001 | | |
| | Regional portal (e.g., EMIAS) | | | | | 0.007 | | <0.001 |
| | Healthcare providers' websites | <0.001 | <0.001 | 0.015 | <0.001 | <0.001 | | <0.001 |
| | Healthcare providers' smartphone application | | <0.001 | | | | | |
| | Messengers | | <0.001 | | | <0.001 | | |
| | Did not use | <0.001 | <0.001 | 0.001 | <0.001 | <0.001 | | <0.001 |
| Primary factors of provider choice | Location | | | | | | | |
| | Price | 0.002 | | | <0.001 | | 0.002 | <0.001 |
| | Qualification | | | | <0.001 | | 0.007 | |
| | Testimonials | | | | | | | |
| | Brand | | | | | | | |
| | Uncertain | | | | 0.001 | | | <0.001 |
| Preferable device to access the Internet | PC | <0.001 | <0.001 | | | | | |
| | Laptop | | | | | | | |
| | Tablet | | | | | | | |
| | Smartphone | | <0.001 | | | <0.001 | | |
| | Smart TV/Gaming console | | | | | | | |
| | Uncertain | | | | | <0.001 | | |

Health-related factors (number of chronic diseases and number of medical visits in the past year) were significantly associated with the majority of main actions on the Internet. What is interesting about the findings is that the number of medical visits was more determinative than the number of chronic diseases for primary sources of health information and main digital tools to manage appointments. This finding suggests that patients are more likely to seek medical advice and use digital tools to manage appointments when they have more frequent medical visits, rather than when they have a higher number of chronic diseases. This could be because people with chronic diseases may already have well-established methods of managing their care and, therefore, may not need to use digital

tools or seek medical advice as frequently. This finding could help healthcare providers better understand the needs of their patients and develop strategies to ensure that those who visit the healthcare facility are receiving the information and support they need to manage their care.

Despite overall differences in preferences among all the participants, there are more detailed insights into the context of digital health access coming from the overall exploratory data table presented in Supplementary Materials Table S1. The supplement table illustrates the gradient-like differences in proportions of those who chose individual answers.

### *3.1. Main Actions on the Internet*

Social media usage prioritization was much more frequent among females (68.2%), those in the young (84.9%) and middle-aged (70.5%) groups, groups of respondents with basic general (78.8%) and general secondary (70.1%) education, groups of more active Internet users (74.1%), groups of respondents who had no chronic diseases (77.0%), and those who did not visit healthcare facilities in the last year (71.1%). The reported priority of Internet usage for news was more frequent in middle-aged (48.0%) and older (68.2%) groups, the most educated respondents (51.7%), groups of those who less actively used the Internet (61.9%), had more chronic diseases (58.0%), and visited healthcare facilities more frequently (58.8%). The proportion of those who used the Internet to access social media for entertainment, education, and gaming grew from lower to higher educated, while it diminished in the same direction for news, work, and consumerism purposes. The distribution was similar when comparing groups of respondents with different numbers of chronic diseases and frequency of medical appointments during last year and exactly the opposite for groups with different average Internet use time. The comparison of groups of different places of residence showed no significant differences in proportions across all purposes.

### *3.2. Primary Sources of Health Information*

The proportion of respondents who reported social media as a preferred source of information was higher among females (20.7%), young (24.3%) and middle-aged (19.6%) groups, and more active Internet users (17.7–21.6%). Search engines were preferred by females (68.5%), middle-aged respondents (66.9%), respondents with secondary vocational (58.8%) and higher (68.8%) education level, more active Internet users (54.9–68.9%), and those who visited healthcare facilities from one to three times (63.9%). A similar pattern was observed when comparing both the importance of review websites and clinician directories, except that the largest proportion of those who prioritized clinician directories within the age groups was shifted to the youngest one (25.2%) instead of middle-aged. Males (35.4%), older respondents (31.0%), rural residents (31.0%), respondents with basic general education (53.8%), less active Internet users (47.8%), respondents with no chronic diseases (30.4%), and those who did not visit healthcare facilities in the last year (37.2%), in turn, more likely did not use any digital sources to find the health information, including information about healthcare providers.

### *3.3. Main Digital Tools to Manage Appointments*

The usage of the federal portal Gosuslugi was the highest among the middle-aged group (38.1%), respondents with higher education (40.9%), more active Internet users (38.4% and 37.1%, respectively, compared with groups of those who used the Internet for 3–4 and 5 or more hours per day), and the group of those who visited healthcare facilities from one to three times in a last year (36.4%). Regional portals were more likely to be used by females (13.8%), respondents who had a higher education (15.3%), respondents who had one chronic disease (16.0%), and respondents who visited healthcare facilities for 4–6 (14.2%) and 7 or more (25.9%) times during the last year. Healthcare providers' websites were more likely to be preferred by females (39.9%), young (39.2%) and middle-aged (37.8%) groups, urban residents (36.3%), respondents with higher education (41.6%),

more active Internet users (41.2% and 39.3%, respectively, compared with groups of those who used the Internet for 3–4 and 5 and more hours per day). The proportion of those who preferred healthcare providers' websites was the highest among those who visited healthcare facilities for 1–3 (38.9%) and 7 and more (43.5%) times during the last year, but low in those who visited healthcare facilities 4–6 times. Healthcare providers' smartphone applications were more likely to be used by young (9.1%) and middle-aged (6.3%) survey participants. The role of messengers was prioritized by females (16.1%), young (20.6%) and middle-aged (13.5%), respondents who spent 3–4 h using the Internet (19.8%), those who had no chronic diseases (17.0%), and those who visited healthcare facilities from one to three times in the past year (16.4%). The most striking result to emerge from the data is that the proportion of those who did not use any digital tools was the highest compared with any other answer. The proportion of non-users was the highest among the males (53.7%), older respondents (59.0%), rural residents (61.9%), respondents with lower education (52.4–63.5%), less active Internet users (54.9–73.1%), and respondents who did not visit healthcare facilities in the last year (60.8%).

### *3.4. Primary Factors of Provider Choice*

The most interesting yet expected result was found when comparing groups of different places of residence. The factor of service price was prioritized by females (41.1%), respondents with post-graduate advanced education (44.0%), more active Internet users (39.5% for both groups of respondents who used the Internet for 3–4 and 5 and more hours daily), respondents with two and more chronic diseases (44.7%), and for those who visited healthcare facilities more frequently, where it grew from 23.9% among those who did not visit to 48.2% among those who had seven or more appointments in the last year. The significantly higher importance of healthcare providers' qualification gradually increased from the least educated (42.3%) to the most educated (79.3%) groups. There was no significant difference among all the groups when comparing proportions of respondents who prioritized location, testimonials, and brand. However, additional pair-wise comparisons revealed that location was significantly more important for those who lived in rural areas than for those who lived in cities (49.6% vs. 37.5%, $p = 0.037$). There was no significant difference among all the groups when comparing pair-wise proportions of respondents who prioritized testimonials and brands. The highest level of uncertainty about factors' priority was observed in older (10.3%), less educated (19.2%) respondents, and the group of those who did not visit healthcare facilities in the last year (14.6%).

### *3.5. Preferable Devices to Access the Internet*

A comparison of the proportions of preferred devices to access the Internet among groups significantly showed that personal computers were more preferred by male respondents (50.8%), middle-aged and older respondents (51.6% and 51.3%, respectively), and those who had two and more chronic diseases (53.0%). What is interesting about the data in this question is that the largest proportion of tablet and smartphone users was observed in groups of respondents who used the Internet from 1 to 4 h daily (73.3–74.8%). Smartphones were also more likely to be used by younger and middle-aged respondents (74.6% and 74.1%, respectively). There were no significant pair-wise differences between all groups when comparing usage of smart TV or gaming console and laptop as a device for Internet access. A pair-wise comparison of tablet use revealed one significant difference between those who used the Internet from 1 to 2 h and from 3 to 4 h daily (42.6% vs. 32.5%, $p = 0.039$).

## 4. Discussion

The initial objective of the study was to analyze Russian adults' preferences on health information resources and the utilization of digital healthcare tools. The present analysis revealed digital disparities among demographic, social, and health groups, which is in line with previously conducted studies [56–58].

The association of groups and preferences on health information resources and the utilization of digital healthcare tools showed that adults not only use the Internet for different purposes but also prefer different devices, sources of health information, and digital tools to manage their medical appointments. It should also be noted that older people more often experience difficulties in characterizing their priorities on the aspects of devices, Internet, and digital tools utilization, which can be explained by the lower technical skills of this group, which corresponds to the findings of earlier studies [40].

The most prioritized activity on the Internet across all of the respondents was social media (64.1%; 95% CI 61.4–66.6%.) This result showed a similar share of social media users in Russia compared with Central and Eastern European countries (51–69%), but smaller than in Southern and Northern European countries (71–78%), North American countries (72–75%), and Asian–Pacific countries (75–83%) [59]. The share was lower compared with Federal State Statistics Service data (76.7%) [34]. This can be explained by the design of the survey that was focused to identify the prioritized activities, but not all possible activities, and by the absence of children and adolescents in the population of interest. However, there was a dramatic difference of 54.1% between shares of social media users in groups of younger (84.9%) and older adults (30.8%), similar to that in Germany (51%) and Hungary (51%) [59]. The Internet utilization for entertainment, games, and education followed the same pattern. Females more actively used the Internet for social media and shopping compared with males, while Internet usage for games prevailed among males. This result is in line with recent studies [60], including the research conducted by Su et al. (2020), who showed the association between gender and Internet-related disorders that are associated with games for males and social media for females [61]. The gradient-like differences in preferable activities on the Internet suggest promising channels of communication for different demographic, social, and health groups. News websites may be used to interact with older, more educated, and less active Internet users, which is supported by findings of Geçer et al. (2022) [60], while social media, entertainment, and education platforms may be used for interactions with younger, less educated, more active and healthier groups of adults. The differences in Internet usage perceptions may be used to define channels for public health communications to address specific needs of demographic, social, and health groups in web environments that are comfortable and familiar for those groups. Healthier and younger adults may be targeted for primary prevention activities in social media, entertainment, and educational web resources, while older and more educated adults will be potentially more engaged with news portals.

Females, those more educated, and more active Internet users were more likely to use all available sources to gather health information. The finding of association between the more active usage of the Internet and the more active use of different web-based sources found in this study is consistent with that of Oshima et al. (2021) who showed a more than a threefold difference in seeking information on the Internet between adults who used the Internet and those who did not use the Internet [62]. However, the difference found in this study was not as dramatic because of inclusion limited to patients who at least rarely used the Internet. The difference in preferences on health information sources among groups with different education levels may point to lower trust of health information on the Internet by lower-educated adults, which was found in a research conducted by Kwon et al. (2015) [63]. This may potentially be associated with lower health literacy that does not allow lower-educated adults to understand and critically appraise the information presented on the Internet, thus limiting their ability to perceive, one of the key personal abilities determining access to healthcare [2]. Consistent with the literature, this research found that females were more likely to use all available sources of health information compared with males, more than one-third (35.4%) of whom did not use any of the available Internet sources at all. According to the findings of previous studies, females have higher engagement in health-related activities for themselves and family members, acting as caregivers [39,64]. Only one-tenth of adults from the older group (10.0%) reported that they prefer to gather health information from social media, which

is in line with the identified preferences on Internet activities in this group shown in the current and other studies [59]. Almost one-third (31.0%) of them did not use any Internet-based health information resources. This supports previous findings on worse engagement of older adults in seeking health information online [65]. The analysis of respondents' answers highlights the particular importance of health websites as the main tool for health-related communication with the population on the Internet, as they are the main sources of information available for review when searching for information using search engines. Aggregator websites with reviews and information about healthcare providers (facilities and clinicians) are also found to be important, which emphasizes the need to use different ways of engaging and presenting health-related information on the Internet. The analysis of preferences on health information resources additionally highlighted the presence of a digital divide, since there were groups (males, older adults, less educated, and less active Internet users) who less likely used the Internet to gather health information from any of given sources.

Almost one-half of the respondents (48.0%; 95% CI 45.3–50.7%) reported that they did not use any digital tools to manage their medical appointments and health information. This share was, however, lower than in the United States, where 72.6% of individuals never used technologies to interact with the healthcare system [36]. The distribution of non-users of digital tools to manage medical appointments was similar to non-users of health information sources, including males, older adults, those less educated, and less active Internet users. Those patterns can be explained similarly to usage of sources of health information: older and lower-educated patients may have lower trust and digital skills. However, findings on females' perception of digital tools to access healthcare showed that they more frequently use all the available tools to manage appointments compared with males. These results are in accord with the majority of recent studies indicating that females are more health activated and involved in caregiving and decision-making processes regarding their own and family members' health [36,39,43]. However, the review conducted by Mistry et al. (2022) provided evidence that females were less likely to use digital tools for health-related purposes [38]. The explanation of this contradiction may be related to gender-related preferences for in-person patient–provider communication [35]. However, this requires further analysis and discussion, including the investigation of characteristics of gender roles and gender-related barriers to access to, and use of, healthcare services, following important evidence of gender iniquities worldwide [66]. In addition to that, digital tools were also less likely to be used by those who visited healthcare facilities less frequently or did not visit at all. The proportion of those who used different tools within groups highlights not only the lower engagement of individual groups but also possible communication barriers, as the lack of an appointment function on health care organizations' websites will make it difficult for different groups to make appointments. These results suggest that digital health tools are still not widely used. Furthermore, the use of digital tools is largely associated with sociodemographic characteristics, such as gender, age, and education, as well as the frequency of healthcare visits. While these tools offer potential benefits to patients, they may not be accessible or relevant to certain groups of the population. This highlights the importance of considering the characteristics of the population when developing and implementing digital tools to manage health information and medical appointments.

Interestingly, healthcare provider choice was not highly factor-dependent. However, pair-wise comparison revealed that those who lived in rural areas were more likely to prioritize providers' location than those who lived in cities (49.6% vs. 37.5%). It emphasizes the need to adopt SDG 11 "Make cities and human settlements inclusive, safe, resilient and sustainable" and its targets for properly located healthcare facilities within Russian cities and especially rural settlements. Both the price of medical services and healthcare providers' qualifications were prioritized by those more educated, those who had more chronic diseases, and those who had more medical visits during the past year. The price of medical services was prioritized by more active Internet users. The differences in priorities

of specific information that influence consumers' choice of healthcare provider gives insight into information prioritization of healthcare providers' web resources aimed at satisfying information needs of specific groups of adults.

Differences in proportions of the devices used determine the preferred contextual aspects of digital communication. Smartphones were more likely used by younger and more active Internet users, while personal computers were prioritized as the preferable device to access the Internet by males and older adults. These results reflect those of Saied et al. (2014) and Estacio et al. (2019), who also found that older adults underutilize electronic devices [42,43]. Differences in device usage proportions within groups additionally stressed the presence of digital disparities that are not only in personal preference on the Internet but also in the way to access it. Healthcare providers and public health authorities should consider these differences when designing and implementing health education and health promotion programs.

Considering the existing inequalities in Internet penetration in urban and rural areas, it is important to improve Internet coverage planning at regional and national levels. The better digital accessibility of information regarding health and healthcare providers for all groups of the population will improve the promotion of well-being (SDG 3) and support the positive link among urban, peri-urban, and rural populations (SDG 11) by strengthening the abilities of patients living in different conditions to seek, to reach, and to engage in healthcare activities. The problem of in-person access to healthcare in smaller settlements may be offset by better digital access to telemedicine services along with improvement of broadband availability and digital skills development. Therefore, governmental and health authorities should focus not only on better planning and development of healthcare services and internet coverage in cities and smaller settlements but also on the improvement of digital skills among different groups, especially those who do not use the Internet for health purposes.

The usage of appropriate digital communication channels will potentially enhance the timeliness of healthcare services and strengthen health promotion among patients of all demographic, social, and health groups, consequently, reducing national expenditure on care associated with unfavorable outcomes and preventable morbidity.

The proportion of urban citizens in the study was different from the Russian population (90.1% vs. 75%, respectively), thus interpretation of findings and differences between social and health groups should be limited to mainly the urban population. However, participation of peri-urban and rural citizens allows us to identify differences in individual preferences, behaviors, and abilities between urban and rural populations, which may be adopted for development planning on a local level.

## 5. Conclusions

This study analyzed Russian adults' preferences on health information resources and the utilization of digital healthcare tools. It found significant digital disparities among demographic, social, and health groups, such as gender, age, education level, Internet activity, and location. It was found that females, those more educated, and more active Internet users were more likely to use all available sources to gather health information, while males, older adults, those less educated, and less active Internet users were less likely to use Internet sources of health information and digital tools to manage their medical appointments. The study also highlighted the need for better Internet coverage in urban and rural areas, and for the improvement of digital skills among those who do not use the Internet for health purposes.

The study focused mainly on self-reported preferences and not just the utilization of the Internet, devices, and digital tools. The novel component of the current study is that it provides an in-depth understanding of digital health disparities among Russian adults and the potential strategies to bridge the gap that can be used for digital health transformation in developed countries. Despite the differences among groups, the results of the study revealed that both public health authorities and health providers have to provide

a wider range of information and digital interaction experiences appropriate to the needs and preferences of patients.

Future research in Russia could explore how digital health tools can support patient-centered care and prevention, particularly for groups that were shown to have barriers to access. It is worth exploring the relationship among demographic, social, and health factors on online health behaviors, particularly health information seeking. Further research could also explore the potential of digital healthcare tools to reduce healthcare costs, improve care coordination, and improve patient access to care. Finally, research could be conducted to evaluate the potential of digital healthcare tools to improve the overall healthcare quality of healthcare.

**Supplementary Materials:** The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su15032271/s1, Table S1: The distribution of digital preferences among Russian adults' (n = 1319).

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