**Telemedicine and eHealth literacy in the era of COVID-19: A cross-sectional study in a** **peripheral clinic in Israel**

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The COVID-19 pandemic has accelerated and expanded the use of telemedicine due to the need for isolation, quarantine, and social distancing. We sought to understand the extent of use of telemedicine and the correlation between eHealth literacy and satisfaction with using telemedicine during the pandemic. In a convenient sample, 156 participants from a clinic in a peripheral community in southern Israel filled an online questionnaire. We found that 85% knew how to use the internet for health information, but only one third felt safe using it to make health decisions. In addition, 93% used the internet for technical needs, such as renewing prescriptions or making a doctor’s appointment. Even lower use was found (38%) for consultation or treatment sessions. Moreover, a positive correlation was found between variables (rp=0.39, p<0.001). Although respondents understood the benefits of telemedicine, they were not satisfied nor interested in online sessions after the epidemic’s end, preferring a meeting with personal interaction. Young people and academics benefit more from telemedicine, thus creating usage gaps and potentially increasing existing inequality. We recommend developing intervention programs, especially among vulnerable populations, to strengthen eHealth literacy and remove barriers regarding skepticism in the use of telemedicine during and after the pandemic.

**Keywords:** telemedicine, eHealth Literacy, internet, access, periphery, COVID-19

**Introduction**

The COVID-19 pandemic has expedited and expanded the use of telemedicine globally. The need for and advantages of telemedicine have been most apparent in a period when people have been required to remain in isolation, lockdown or maintain social distancing to reduce infection. Even while the health system is forced to contend with the virus, it is necessary to ensure that essential medical services are provided within the community, to prevent damage to public health and the deterioration of patients’ medical condition. Telemedicine enables us to reduce transmission of the virus while guaranteeing continued medical treatment (Portnoy, Waller & Elliott, 2020).

Research has shown that an online morning session for a physician might also be effective in less complex medical cases. Thus, for example, a study conducted several years ago found a number of advantages to treatment of [chronic congestive heart failure](https://www.infomed.co.il/disease-277/) by telemedicine, including less hospitalization time and fewer cases of mortality (Lin et al., 2017). For the patients, this involved a saving both in terms of time and costs (Vespignani et al., 2018), access for the elderly, people living in geographically remote areas, and those with disabilities (Edge et al., 2020), as well as the prevention of contracting infectious diseases for both patients and staff (López et al., 2011). The disadvantages of using telemedicine relate to medical confidentiality and concern over hacking information systems, the inability to provide lifesaving care or to conduct certain tests immediately, and the inability to undergo a physical checkup, as well as obstacles related to clinician-patient relations (Layfield et al., 2020). The use of telemedicine depends to a large extent on the level of eHealth literacy of the specific individual (Coleman, 2020).

### eHealth literacy

Electronic Health (or eHealth) literacy is defined as the ability to search, locate, and understand health information from electronic sources, to evaluate the quality of the information, and to implement it in order to relate to a given health problem or to improve the state of health (Diviani et al., 2015). People who have a good degree of eHealth literacy receive more healthcare information, their sources of information are more varied, they are better able to evaluate the quality of the information and they describe a much greater volume of usage results (Koh & Rudd, 2015). eHealth literacy poses a challenge to various population groups, such as: immigrants, ethnic minorities, the elderly, low-income individuals, and those living in areas without home broadband access (Nouri et al., 2020). Dobrusin et al. (2020), found that during the COVID-19 pandemic the use of telemedicine increased dramatically, and younger patients tended to be more satisfied with virtual treatment sessions than older patients. In other words, it is precisely those people who are in greater need of healthcare services who found it more difficult to use telemedicine, and thus they expressed a lesser degree of satisfaction. People with limited eHealth literacy are likely to gain less access to credible materials based on education toward internet healthcare (Yom-Tov et al., 2016; Meppelink et al., 2016). They are at a higher risk of a negative health result compared with patients with a higher degree of eHealth literacy (Svendsen et al., 2020). Low eHealth literacy is related to a lifestyle that is not conducive to improving health, difficulty in navigating through the maze of the health system, and under-use of healthcare services (Duplaga, 2021; Kostareva et al., 2020), as well as a low response to treatment using medication, hospitalization, and a greater risk of mortality (Mantwill, Monestel-Umaña & Schulz, 2015; Ingram, 2012; Long et al., 2014). Studies have shown that people suffering from chronic diseases such as diabetes and hypertension, with a high degree of eHealth literacy, tend to monitor and manage their disease more competently, they are more satisfied with the telemedicine services and respond faster to changes that might adversely affect their situation, and thus improve their health (McNaughton, Jacobson & Kripalani, 2014; Fan et al., 2016).

The COVID-19 pandemic expedited various processes, including the development of telemedicine. The clinician-patient meetings via the internet were an inevitable consequence of the need for social distancing. People without access to the internet or who lack the requisite technological skills are likely to encounter difficulty in obtaining medical services (Grossman et al., 2019). The current study aspires to shed light on the link between age, eHealth literacy, and satisfaction with telemedicine in the context of its use in geographically outlying areas.

# The study method

**Participants and process**

A cross-sectional study was conducted, in which 156 people above the age of 18 participated, who belong to a primary medicine clinic in the southern peripheral area of the State of Israel. The survey was conducted at the request of the clinic manager who wished to ensure that the patients succeed, are sufficiently eHealth literate, and able to use the telemedicine services during the pandemic. The clinic has 412 members over the age of 18. Approval for the study was received from the Ashkelon Academic College Ethics Committee (Approval no. #28-2020). The questionnaires were programmed using the Qualtrics survey software platform. The link to the survey was sent via text message from the clinic on December 17, 2020. A reminder was sent a week later and on January 31, 2021, the survey was closed on the software platform. According to the software data, the average response time to the questionnaire was four minutes. There were 187 entries into the survey, 156 participants completed the questionnaire (83% of the total number of entries into the survey, 38% of the total number of adult patients at the clinic).

**The study tools**

An online, closed-ended, anonymous, self-administered questionnaire (Annex A) was used. The questionnaires were translated from English by the authors. Initially, the questionnaire was translated from English into Hebrew, then back translated from Hebrew to English, and finally back into Hebrew, and the different translation versions were then compared to ensure the reliability of the translation. In the second stage, a pilot was conducted amongst ten people to ensure that the questions were readily comprehensible; the questionnaire was amended in accordance with the subsequent comments. Finally, the questionnaire was approved for content validity by three telemedicine and public health experts. In their report, the experts wrote that the questions are related to the subject matter of the variables and are appropriate for Israeli culture, and they proposed adding two questions related to the COVID-19 pandemic as detailed in Section 3. The questionnaire contained 34 questions according to the following breakdown:

1. Demographic data - gender, date of birth, level of education, country of birth, year of Aliyah, are there health-related apps installed on the mobile phone?
2. Healthcare related actions conducted over the internet during the last six months - eight actions. For example, checking test results; scheduling a doctor’s appointment, an online treatment session, and attending medical forums for consultation. The participants were required to provide yes/no answers for each action.
3. eHealth literacy - seven questions, the first five of which were taken from Norman & Skinner (2006) and the last two dealing with the COVID-19 pandemic were added by the authors on the recommendation of the experts. The examinees were asked to write down to what extent they agreed to each statement in the questionnaire on a scale ranging from 1 (not at all) to 5 (to a very large extent). For example: know how to use the internet to respond to health-related questions; know how to find useful healthcare information on the internet, and regarding the COVID-19 pandemic: consume more healthcare related information on the internet since the outbreak of the COVID-19 pandemic and look for information on the internet about the COVID-19 vaccine. The variable was built by calculating the average for each examinee. The average ranged between 1-5, whereby a higher score was indicative of a higher level of eHealth literacy. Internal reliability was α=0.80.
4. Satisfaction with telemedicine - ten questions taken from Parmanto, Lewis, Graham & Bertolet (2016). The examinees were asked to write down to what extent they agreed to each statement in the questionnaire on a scale ranging from 1 (not at all) to 5 (to a very large extent), and an option was also given to write down 6 (irrelevant). For example, I am satisfied with my experience of a treatment session with medical staff via the internet; I will continue to use telemedicine services for treatment sessions even after the pandemic. The variable was built by calculating the average for each examinee, without the option of “irrelevant”. Reversing scales was carried out for the question: “I tried to enter an online treatment session but without success”. The average ranged between 1-5, whereby a higher score was indicative of a greater use of telemedicine. Internal reliability was α=0.89.

**3.6 Data processing**

The data were processed with SPSS V. 25 software. Preliminary analysis indicated a normal distribution of variables, so the correlations between the variables were examined using the Pearson correlation coefficient, gender differences were examined using t-tests for independent samples. Finally, a (multiple) linear regression model was constructed to examine those variables that best forecast the satisfaction with telemedicine.

# Findings

## Description of the sample characteristics

156 examinees took part in the survey. The age range was between 19-76, and the average age was 34±16.48. The time elapsed since immigrating to Israel for those participants not born in Israel (n=31, 20%) ranged between 10-61, with the average time being 32±10.54.

Table 1: Description of the sample characteristics

|  |  |  |
| --- | --- | --- |
| **Characteristic** | **Values** | **Overall sample****(n=156)** |
| **N** | **%** |
| Gender | WomenMen | 10452 | 6733 |
| Country of birth | Israel | 125 | 80 |
| Level of education: | High schoolProfessional post-schoolAcademic | 3123102 | 201565 |
| Religious level | SecularTraditionalReligious | 924519 | 592912 |
| Existence of a health-monitoring app | Yes | 123 | 79 |
| Age group | 19-3031-50Above 50 | 684840 | 443125 |

### eHealth literacy

It transpires that 85% of the respondents know to a large extent how to use the internet so as to reply to questions relating to healthcare. 78% know to a large extent where on the internet to find useful healthcare information. Two thirds know how to use the healthcare information they find on the internet. However, only 60% of the respondents know to a large extent how to evaluate the healthcare information they find on the internet, and 36% feel confident of using the information on the internet to make health-related decisions. 41% now consume more healthcare information on the internet since the outbreak of the COVID-19 pandemic to a large extent, and one third testified that they searched for material on the internet on the COVID-19 vaccine to a large extent. In order to construct the eHealth literacy variable, the average of all the answers was calculated for each participant. The overall average was 3.58 (SD=0.72).

### Satisfaction with telemedicine

Generally, 59% were satisfied to a large extent with the telemedicine services and 23% to a moderate extent. A further finding was that 81% believed that telemedicine saves much time and waiting in line, 80% were of the opinion that telemedicine constitutes an excellent solution for the COVID-19 era, 70% felt that the apps were easy to use, 68% felt that the telemedicine improves their access to the healthcare services, while 61% believed that the telemedicine is appropriate for their healthcare needs. Close to one half (45%) assumed that they will continue to use the telemedicine services for their treatment session even after the pandemic has ended. About one third of the overall sample (36%) were satisfied with their experience of a treatment session with healthcare staff on the internet (they represent 53% of all the respondents who attended a treatment session on the internet). However, only one quarter thought that the visits held in an online format were identical in quality to in-person visits (they represent 38% of all the respondents who attended a treatment session on the internet).

### The correlations between the variables

The relationships were examined using the Pearson correlation coefficient. No correlation was found between age and eHealth literacy (p=0.65). However, a negative correlation of moderate significance was found between age and satisfaction with telemedicine (rp= -0.23, p<0.05). In addition, a positive correlation of high significance was found between eHealth literacy and satisfaction with telemedicine (rp=0.39, p<0.001) Namely, the more an examinee is eHealth literate the higher his/her satisfaction with telemedicine. Therefore, these assumptions were confirmed.

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## The scope of internet use for healthcare needs

The examinees were given a list of healthcare needs, and they were asked to note if they use the internet for these needs. The table below features the percentages of those examinees who responded “yes”.

Table 2: Internet use for healthcare needs

|  |  |
| --- | --- |
| **Use** | **Gave a positive response (%)** |
| 1. Reading an article or watching a video on medical-related topics
 | 93 |
| 1. Making a doctor’s appointment
 | 92 |
| 1. Consulting or reading about diseases, medications, or medical treatments
 | 91 |
| 1. Checking test results
 | 86 |
| 1. Receipt of updates on medical issues by email/text message
 | 76 |
| 1. Request for a repeat prescription
 | 67 |
| 1. Online treatment session with a doctor/nurse/dietician etc.
 | 38  |
| 1. Attending medical forums for consultation
 | 12 |

### Later on, a variable was constructed indicating the scope of internet use for healthcare needs by counting the positive answers for each examinee. The variable range was between 0 (does not use the internet at all for healthcare needs) and 8 (used the internet for all the uses mentioned). The average was 5.53 (SD=1.40). 8% of the participants (n=12) were in the range between 0-3, 36% of the participants (n=57) were in the range between 4-5 and the rest were above 6 (n=87, 56%). Afterwards, the correlations between this variable and the study variables were examined and positive correlations of moderate significance were found between the scope of internet use for healthcare needs and eHealth literacy (rp=0.23, p<0.01) and satisfaction with telemedicine (rp=0.25, p=0.001).

## Gender differences

Significant differences were found between the genders as to the level of their e-literacy (t(154)=3.32, p=0.001). Women had a higher degree of eHealth literacy compared to men (an average of 3.71 compared with 3.32). Significant gender differences were also found in relation to satisfaction with the use of telemedicine (t(154)=3.00, p<0.01). Women had a higher degree of satisfaction compared to men (an average of 3.94 compared with 3.55). In addition, significant differences were found between the genders as to the scope of their use of the internet for healthcare needs (t(154)=4.33, p<0.001). Women had a higher degree of satisfaction compared to men (an average of 5.86 compared with 4.88).

## The differences between education levels

Examination of the differences between academics and non-academics showed that there are significant differences between them as regards the level of e-literacy (t(154)=3.11, p<0.01). Academics had a higher degree of eHealth literacy compared to non-academics (an average of 3.71 compared with 3.35). Significant differences between academics and non-academics were also found in relation to satisfaction with the use of telemedicine (t(154)=4.32, p<0.001). Academics had a higher degree of satisfaction compared to non-academics (an average of 4.00 compared with 3.46). In addition, differences were also found in the scope of use of the internet for healthcare needs (t(154)=3.08, p<0.01). Academics had a higher degree of satisfaction compared to non-academics (an average of 5.78 compared with 5.07).

## A regression model for forecasting satisfaction with telemedicine

Table 3 portrays results of a (multiple) linear regression model for forecasting satisfaction with telemedicine. The final model is presented below:

Table 3: Linear regression models for forecasting satisfaction with telemedicine

|  |  |  |  |
| --- | --- | --- | --- |
| **Name of variable** | **B** | **B** | **p** |
| Ehealth literacy | 0.33 | 0.30\*\*\* | 0.000 |
| Education 0-non-academic, 1-academic | 0.37 | 0.24\*\*\* | 0.003 |
| The scope of internet use for healthcare needs | 0.23 |  0.17\* | 0.025 |
|  R2Adj R2 | 0.220.21 |
| N | 156 |

\* p<0.05, \*\* p<0.01, \*\*\* p<0.001

A significant regression was obtained (F(154)=14.63, p<0.001), with an explained variance percentage of 22%. We can see that a higher level of eHealth literacy, an academic education and greater use of the internet for healthcare needs, lead to greater satisfaction with telemedicine. In the preliminary model, gender and age did not provide a significant contribution to the model; therefore, they were removed from the final model.

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# Discussion

Telemedicine has developed considerably over the last two decades, mainly to make healthcare services accessible to outlying, peripheral areas; and gained momentum as a result of the COVID-19 pandemic in order to reduce person-to-person interface and slow down the spread of the pandemic (Monaghesh & Hajizadeh, 2020). In Israel there are marked gaps in the access to healthcare services in geographically peripheral areas (Dopelt et al., 2014). This study illustrates the inherent potential in the use of this tool during emergency periods, but also shows that what might work during a time of emergency might not necessarily work during routine; therefore, it is important to gain a much better understanding of the characteristics of its use.

The study participants demonstrated moderate to high levels of eHealth literacy. They knew how to search for medical information on the internet (85%) and how to use that information (65%) but were skeptical and suspicious about the reliability of using it, as only 36% felt confident about using the information from the internet in order to make health-related decisions. This finding is consistent with Farrugia et al. (2021), who found that young people were skeptical about accessing online information regarding sexual health. They explained that today young people are regarded from the outset as being skeptical. Additional studies have arrived at similar findings (for example, Trujillo, & Motta, 2021; Su et al., 2021), and reliability evaluation has been mentioned as a key component in the process of searching for the healthcare information on the internet (Choi, 2020).

All the study participants used the internet for health-related needs. The study shows that they preferred to use the internet for “technical” needs, such as making a doctor’s appointment (92%), checking test results (86%), or asking for a repeat prescription (67%). But when it comes to a need to engage in a treatment session (38%) or medical consultation (12%), the percentage figures are much lower. As transpires from additional research studies conducted during the COVID-19 era (Shaverdian et al., 2021), the participants understood the advantages of telemedicine, such as improving waiting time and saving time as a whole (81%), ease of use of the app (70%), and improved accessibility (68%). However, in contrast to the findings in previous studies that showed a high level of satisfaction with online treatment sessions (Fieux et al., 2020; Shaverdian et al., 2021; Holcomb et al., 2020; Mann et al., 2020), in the current study only 36% expressed satisfaction at the online sessions, and only 38% of the respondents who attended treatment sessions on the internet felt that the online visits were identical in quality to in-person visits. Less than one half of them (45%) believed that they will use telemedicine after the pandemic is over. These findings are consistent with Sousa et al. (2021) who found that “patients were satisfied with communication with providers; however, one half evaluated the online visit as inferior when compared to in-person visits”, and also with Horrell et al. (2021), who found that 43% of the participants preferred to return to face-to-face, in-person meetings, whenever this would be possible, in the post-COVID-19 era.

Although telemedicine is a simple way to maintain treatment continuity while reducing the risk of infection, but paradoxically, on the one hand, the COVID-19 pandemic has forced us into lockdowns and social distancing; and thus, the use of telemedicine has increased. However, on the other hand, this study shows that perhaps precisely because of the social distancing, patients are once again looking for the interpersonal relationship and the human interaction with their physician, despite their awareness of the advantages of telemedicine. The COVID-19 era has been replete with tension, pressure, mental difficulties and anxiety, and precisely when patients have been in need of greater support, empathy and a human touch, they were forced to give up on all of these. Moreover, while in those studies conducted prior to the COVID-19 pandemic, the patients were able to choose between an in-person or online treatment session, during the COVID-19 pandemic crisis online treatment has not been the patient’s personal choice, but rather a constraint and an unavoidable necessity.

Despite the assumption, this study found no link between age and eHealth literacy, although previous studies have shown that younger users have used information available online in a more judicious manner, compared with older users (Dobrusin et al., 2020). We can offer a number of explanations for this finding. Firstly, the survey was online, so that from the outset there was a bias towards the more “technologically minded” population with access to internet services. Secondly, COVID-19 has promoted digitalization and has forced the more elderly population also to begin to use online services, whether for shopping, virtual meetings with family members or for access to healthcare services. The elderly received the requisite technological support from their grandchildren, their neighbors or volunteers who gladly rose to this challenge. The municipal authorities in Israel also came to the help of the elderly population to help with the digital challenge, as did private businesses. For example, the National Insurance Institution, which as part of the “Computer for all Ages” program, established a support group for all senior citizens seeking assistance and instruction on working with computers and/or smartphones. The services included instruction provided to the elderly in their home as well as instruction for pensioners within the community (Goldschmidt, 2020).

The negative correlation found between age and satisfaction with telemedicine is consistent with previous studies that showed the difficulties faced by the elderly with access to the internet and telemedicine (Gustke et al., 2000; Singh & Wachter, 2008), including studies conducting during the COVID-19 period (Ramaswamy et al., 2020; Liu et al., 2020; Smrke et al., 2020). The positive correlation between eHealth literacy and satisfaction with telemedicine was also supported by previous research studies (Rush et al., 2021; Witten & Humphry, 2018).

Women tend to search for more healthcare information than men and use telemedicine more, as per Horrell et al. (2021) who found that 50% of the women used telemedicine compared with 43% of the men, and they voiced greater satisfaction with telemedicine (Rush et al., 2021). On many occasions it is the women in the family who are responsible for overall family health, so they too are the ones who contact the physicians on behalf of other family members (Findling, Dopelt and Krulik, 2008). In addition, women have a longer life expectancy and tend to contract diseases such as diabetes, hypertension, osteoporosis and arthritis, etc., more than men; therefore, they tend to engage in a much greater degree of contact with their family physicians and they consume more healthcare services, including on the internet (Denton & Walters, 1999; Redondo-Sendino et al., 2006).

Examinees with an academic education expressed greater satisfaction and a broader scope of use of the internet for healthcare needs in relation to examinees without an academic education, as was the case in previous studies (Dahlgren et al., 2021). The educated generally tend to be more technologically minded, busier and with greater access to digital means.

## Limitations

The sample in this study is limited and is not representative of the adult population in the State of Israel. The study was conducted among patients in one clinic in a peripheral area and lacks a control group. The study tool was an online questionnaire, so that naturally from the outset there was a bias toward the younger and/or more technologically inclined population that possesses computers/a smartphone and surfs the internet. We may assume that a telephone survey or the manual distribution of questionnaires would have created a more precise picture.

**Conclusions**

It transpires that the use of telemedicine is a significant tool also in relation to geographically peripheral areas, and as such it bears strategic significance for contending with existing gaps in the healthcare system. Young people and individuals with an academic education used more search strategies, they were more discerning and critical of the information available on the internet, the majority of them are actually satisfied with telemedicine, and would like to continue using it once the pandemic is over. This population has highly developed skills for eHealth literacy, and they are the main people to benefit from use of the internet and from digital age technology for medicine.

In contrast, the more elderly and those lacking an academic education, generally tend to prefer continuing to use traditional communication channels to discuss their medical problems, such as an in-person meeting with a clinician or a telephone conversation, rather than the virtual exchange of information. On occasions, they lack the technological knowhow or the means. As a result of the lack of digital information among the more vulnerable strata of the population, who are in greater need of healthcare services, the gaps in health are widening and the resulting inequality between different sections of society is intensifying.

eHealth literacy relates to a person’s ability to obtain, process, understand, and assimilate basic medical information when engaged in decision making. As such, literacy is related to education, study, orientation, proficiency, control, and the ability to implement. All these represent important skill sets in the 21st century. If these technologies were more user-friendly to the patients, less cognitively loaded and more understanding of the needs of elderly patients, we might be witness to greater use and additional exchange of electronic information among the elderly as a whole. Today’s existing structure within the health system and healthcare organizations, creates a degree of complexity that limits the ability of the more elderly population, with weaker eHealth literacy, to use their services.

The behavior of healthcare consumers and of the health system and healthcare organizations under the limitations of the pandemic, proves that it is possible to change a large number of components in the service model, such as a visit to the doctor or consultation with him/her. There is a need to build instruction programs for those segments of the population who face difficulty in engaging in telemedicine, as well as programs to strengthen e-literacy as a whole, and eHealth literacy in particular. It is advisable to examine the approaches and feelings of alienation associated with telemedicine both on the part of the patients and the clinicians. It would also be a good idea to look at the scope of use of telemedicine among people with limited mobility, and whether or not the use of telemedicine improves their quality of life.

**References**

Choi, W. Older adultsʼ credibility assessment of online health information: An exploratory study using an extended typology of web credibility. *Journal of the Association for Information Science and Technology* **2020***, 71*, 1295 - 1307.

Coleman, C. Health literacy and clear communication best practices for telemedicine. *Health Literacy Research and Practice* **2020**, *4*(4), e224–e229. <https://doi.org/10.3928/24748307-20200924-01>

Dahlgren, C.; Dackehag, M.; Wändell, P. et al. Determinants for use of direct-to-consumer telemedicine consultations in primary healthcare—a registry based total population study from Stockholm, Sweden. *BMC Fam Pract* **2021**, 22, 133. https://doi.org/10.1186/s12875-021-01481-1

Denton, M.; Walters, V. Gender differences in structural and behavioral determinants of health: an analysis of the social production of health. *Social Science & Medicine* **1999**, *48(9)*, 1221–1235. [https://doi.org/10.1016/s0277-9536(98)00421-3](https://doi.org/10.1016/s0277-9536%2898%2900421-3)

Diviani, N.; van den Putte, B.; Giani, S.; van Weert, J. C. Low health literacy and evaluation of online health information: a systematic review of the literature. *Journal of Medical Internet Research* **2015**, *17(5)*, e112.

Dobrusin, A.; Hawa, F.; Gladshteyn, M.; Corsello, M.; Harlen, K.; Walsh, C.; Alparthi, L.; Weinstein, M.; Baig, N.; Sousa, A.; Gunaratnam, N.T. Gastroenterologists and patients report high satisfaction rates with telehealth services during the novel coronavirus 2019 (COVID-19) pandemic. *Clin. Gastroenterol. Hepatol* **2020**, pp. 1-17. <https://doi.org/10.1016/j.cgh.2020.07.014>

Dobrusin, A., Hawa, F., Gladshteyn, M., Corsello, P., Harlen, K., Walsh, C. X.,... & Gunaratnam, N. T. (2020). Gastroenterologists and patients report high satisfaction rates with telehealth services during the novel coronavirus 2019 pandemic. Clinical Gastroenterology and Hepatology, 18(11), 2393-2397.

Duplaga, M. The association between Internet use and health-related outcomes in older adults and the elderly: a cross-sectional study. *BMC Med Inform Decis Mak* **2021,***21 150*. <https://doi.org/10.1186/s12911-021-01500-2>

Edge, C.; George, J.; Black, G.; Gallagher, M.; Ala, A.; Patel, S.;... Hayward, A. (2020). Using telemedicine to improve access, cost and quality of secondary care for people in prison in England: a hybrid type 2 implementation effectiveness study. *BMJ Open* **2020**, *10*(2).‏‏

Fan, J. H.; Lyons, S. A.; Goodman, M. S.; Blanchard, M. S.; Kaphingst, K. A. Relationship between health literacy and unintentional and intentional medication nonadherence in medically underserved patients with type 2 diabetes. *The Diabetes Educator* **2016**, *42(2)*, 199-208.

Farrugia, A.; Waling, A.; Pienaar, K.; Fraser, S. The “be all and end all”? Young people, online sexual health information, science and skepticism. *Qualitative Health Research* **April 2021**. doi:[10.1177/10497323211003543](https://doi.org/10.1177/10497323211003543)

Findling, Y.; Dopelt, K.; Krulik, T. The correlation between health perception and quality of life as a function of social support and mental hardiness among Ethiopian and Russian immigrants, *Guf Yeda* (Body of Knowledge), **2008**, *5* (in Hebrew)

Goldschmidt, R. *The Internet and Digital Services for Senior Citizens*. The Knesset: Research and Information Center, Israel, 2017 (in Hebrew) <http://din-online.info/pdf/kn160.pdf>

Grossman, L. V.; Masterson Creber, R. M.; Benda, N. C.; Wright, D.; Vawdrey, D. K.; Ancker, J. S. Interventions to increase patient portal use in vulnerable populations: a systematic review. *Journal of the American Medical Informatics Association* **2019**, *26(8-9)*, 855-870.‏

Gustke, S. S.; Balch, D. C.; West, V. L.; Rogers, L. O. Patient satisfaction with telemedicine. *Telemedicine Journal* **2000**, *6*(1), 5-13.

Holcomb, D.; Faucher, M.A.; Bouzid, J.; Quint-Bouzid, M.; Nelson, D.B.; Duryea, E. Patient perspectives on audio-only virtual prenatal visits amidst the severe acute respiratory syndrome coronavirus 2 (SARS –CoV-2) pandemic. *Obstet Gynecol* **2020**, *136 (2)*, pp. 317-322

Horrell, L. N.; Hayes, S.; Herbert, L. B.; MacTurk, K.; Lawhon, L.; Valle, C.G.; Bhowmick, A. Telemedicine use and health-related concerns of patients with chronic conditions during COVID-19: Survey of members of online health communities. *Journal of Medical Internet Research* **2021**, *23(2)*, e23795.‏

Ingram R.R. Using Campinha-Bacote's process of cultural competence model to examine the relationship between health literacy and cultural competence. *Journal of Advanced Nursing* **2012**, *68*(3), 695–704. 10.1111/j.1365-2648.2011.05822.x

’Koh, H. K.; Rudd, R. E. The arc of health literacy. *Jama* **2015**, *314(12)*, 1225-1226.

Kostareva, U.; Albright, CL.; Berens, EM.; Levin-Zamir, D.; Aringazina, A.; Lopatina, M.; Ivanov, LL.; Sentell, TL. International perspective on health literacy and health equity: Factors that influence the Former Soviet Union immigrants. *International Journal of Environmental Research and Public Health* **2020**, *17(6)*, 2155. <https://doi.org/10.3390/ijerph17062155>

Layfield, E.; Triantafillou, V.; Prasad, A.; Deng, J.; Shanti, R. M.; Newman, J. G.; Rajasekaran, K. Telemedicine for head and neck ambulatory visits during COVID-19: Evaluating usability and patient satisfaction. *Head & Neck* **2020**, *42(7)*, 1681–1689.

Lin, M. H.; Yuan, W. L.; Huang, T. C.; Zhang, H. F.; Mai, J. T.; Wang, J. F. Clinical effectiveness of telemedicine for chronic heart failure: a systematic review and meta-analysis. *Journal of Investigative Medicine* **2017**, *65(5)*, 899-911.

Liu, L.; Gu, J.; Shao, F.; Liang, X.; Yue, L.; Cheng, Q.; Zhang, Z. Application and preliminary outcomes of remote diagnosis and treatment during COVID-19 outbreak: retrospective cohort study. *JMIR Mhealth Uhealth* **2020**, *8 (7)*, e19417

Long S. K.; Kenney G. M.; Zuckerman S.; Goin D. E.; Wissoker D.; Blavin F.; Hempstead K. The health reform monitoring survey: Addressing data gaps to provide timely insights into the affordable care act. *Health Affairs* **2014**, *33*(1), 161–167. 10.1377/hlthaff.2013.0934 PMID:24352654

López, C.; Valenzuela, J. I.; Calderón, J. E.; Velasco, A. F.; Fajardo, R. A telephone survey of patient satisfaction with real time telemedicine in a rural community in Colombia. *Journal of Telemedicine and Telecare* **2011**, *17(2)*, 83–87.

Fieux, M.; Duret, S.; Bawazeer, N.; Denoix, L.; Zaouche, S.; Tringali, S. Telemedicine for ENT: Effect on quality of care during Covid-19 pandemic, *European Annals of Otorhinolaryngology, Head and Neck Diseases* **2020**, *137 (4)*, 247-359. <https://doi.org/10.1016/j.anorl.2020.06.014>

Mann, D.M.; Chen, J.; Chunara, R.; Testa, P.A.; Nov, O. COVID-19 transforms health care through telemedicine: evidence from the field. *J. Am. Med. Inform. Ass*. **2020**, *27 (7)*, pp. 1132-1135. https://doi.org/10.1093/jamia/ocaa072

Mantwill S.; Monestel-Umaña S.; Schulz P. J. The relationship between health literacy and health disparities: A systematic review. *PLoS One* **2015**, *10(12)*, e014545510.1371/journal.pone.0145455 PMID:26698310

McNaughton, C. D.; Jacobson, T. A.; Kripalani, S. Low literacy is associated with uncontrolled blood pressure in primary care patients with hypertension and heart disease. *Patient Education and Counseling* **2014**, *96(2)*, 165-170.‏

Meppelink, C. S.; Smit, E. G.; Diviani, N.; Van Weert, J.C. Health literacy and online health information processing: unraveling the underlying mechanisms. *Journal of Health Communication* **2016**, *21(sup2)*, 109-120.

Monaghesh, E.; Hajizadeh, A. The role of telehealth during COVID-19 outbreak: a systematic review based on current evidence. *BMC Public Health* **2020**; *20(1),* 1193.

Norman, C. D.; Skinner, H. A. eHealth literacy: essential skills for consumer health in a networked world. *Journal of Medical Internet Research* **2006**, *8(2)*, e9.

Nouri, S.; Khoong, E.C.; Lyles, CR.; Karliner, L. (2020). Addressing equity in telemedicine for chronic disease management during the Covid-19 pandemic. *NEJM Catalyst Innovations in Care Delivery* **2020**, 1(3), 1-13.

Parmanto, B.; Lewis Jr, A. N.; Graham, K.M.; Bertolet, M.H. Development of the telehealth usability questionnaire (TUQ). *International Journal of Telerehabilitation* **2016**, *8(1)*, 3.

Portnoy, J.; Waller, M.; Elliott, T. Telemedicine in the Era of COVID-19. *The Journal of Allergy and Clinical Immunology: In Practice* **2020**, *8(5)*, 1489-1491.

Ramaswamy, A.; Yu, M.; Drangsholt, S.; Ng, E., Culligan, P. J.; Schlegel, P. N.; Hu, J.C.. Patient satisfaction with telemedicine during the COVID-19 pandemic: Retrospective cohort study. *Journal of Medical Internet Research* **2020**, *22(9)*, e20786.

Redondo-Sendino, Á.; Guallar-Castillón, P.; Banegas, J.R. et al. Gender differences in the utilization of health-care services among the older adult population of Spain. *BMC Public Health* **2006**, *6, 155*. https://doi.org/10.1186/1471-2458-6-155

Rush, K. L.; Seaton, C.; Li, E.; Oelke, N. D.; Pesut, B. Rural use of health service and telemedicine during COVID-19: The role of access and eHealth literacy. *Health Informatics Journal* **2021**, *27(2)*. <https://doi.org/10.1177/14604582211020064>

Shaverdian, N.; Gillespie, E. F.; Cha, E.; Kim, S. Y; Benvengo, S.; Chino, F.; Kang, J. J.; Li, Y.; Atkinson, T. M.; Lee, N.; Washington, C. M.; Cahlon, O.; Gomez, D. R. Impact of telemedicine on patient aatisfaction and perceptions of care quality in radiation oncology. *Journal of the National Comprehensive Cancer Network* **2021**: JNCCN, 1–7. Advance online publication. <https://doi.org/10.6004/jnccn.2020.7687>

Singh, S. N.; Wachter, R.M. Perspectives on medical outsourcing and telemedicine--rough edges in a flat world? *The New England Journal of Medicine* **2008**, *358(15)*, 1622–1627.

Smrke, A.; Younger, E.; Wilson, R.; Husson, O.; Farag, E.; Merry, E.; Macklin-Doherty, A.; Cojocaru, E.; Arthur, A.; Benson, C.; Miah, A.B.; Zaidi, S.; Gannata, S.; Jones. Telemedicine during COVID-19 pandemic: impact on care for rare cancers. *JCO Global Oncology* **2020**,*6*, 10-46-1051https://doi.org/10. 1200/GO.20.00220

Sousa, C.S.; Trigueiro Barbosa, M.; Aguiar, R.; Benito-Garcia, F.; Morais-Almeida, M. Urticaria and coronavirus infection: a lesson from SARS-CoV-2 pandemic, *Eur Ann Allergy Clin Immunol* **2021**, *53(3)*, 138-142. doi:10.23822/EurAnnACI.1764-1489.182.

Su, Y.; Lee, D.K.; Xiao, X.; Li, W.; Shu, W. Who endorses conspiracy theories? A moderated mediation model of Chinese and international social media use, media skepticism, need for cognition, and COVID-19 conspiracy theory endorsement in China. Comput. Hum. Behav**. 2021**, 120, 106760.

Svendsen, M.T.; Bak, C.K.; Sørensen, K. et al. Associations of health literacy with socioeconomic position, health risk behavior, and health status: a large national population-based survey among Danish adults. *BMC Public Health* **2020,***20 (565)*. <https://doi.org/10.1186/s12889-020-08498-8>

Trujillo, K.L.; Motta, M. How internet access drives global vaccine skepticism. International Journal of Public Opinion Research **2021**, edab012, <https://doi.org/10.1093/ijpor/edab012>

Vespignani, H.; Soufflet, C.; Masnou, P.; Medjebar, S.; Sakkat, E.; Frouin, P.Y. Is telemedicine an adequate solution to perform and interpret EEGs? *Neurophysiologie Clinique* **2018**, *48*(4), 244.‏

Witten, N.A.; Humphry, J. The electronic health literacy and utilization of technology for health in a remote Hawaiian community: Lana’i. *Hawaii J Med Public Health* **2018**; *77(3)*, 51–59.

Yom-Tov, E.; Marino, B.; Pai, J.; Harris, D.; & Wolf, M. The effect of limited health literacy on how internet users learn about diabetes. *Journal of Health Communication* **2016**, *21(10)*,1107-1114.

**Annex A - Questionnaire**

**Dear Sir/Madam,**

The purpose of this survey is to become familiar with the public’s attitude toward telemedicine conducted via the internet. Filling out the questionnaire is on a volunteer basis. The survey is anonymous and we wish to point out that all your answers remain confidential. The data will be processed in a group form alone. The instructions are written in the masculine for the purpose of convenience, but are intended for both women and men.

**Thank you for your cooperation**

Please state if during the last six months you have carried out the following actions on **the internet**: Q2

|  |  |  |
| --- | --- | --- |
| (2) No | (1) Yes |  |
|  |  |  (1) You have read an article or watched a video on medical-related topics |
|  |  |  (2) You have received by email/text message updates on medical issues |
|  |  |  (3) You have consulted or read about diseases, medications or medical treatments |
|  |  |  (4) You have checked test results |
|  |  |  (5) You have made a doctor’s appointment |
|  |  |  (6) You have asked for a repeat prescription  |
|  |  |  (7) You took part in an online treatment session with a doctor/nurse/dietician etc.  |
|  |  |  (9) You attended medical forums for consultation |
|  |  |  (8) Other: |

To what extent was/did the use you made of telemedicine via the internet: Q3

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| (6) Irrelevant | (5) To a very large extent | (4) To a large extent | (3) To a moderate extent | (2) To a small extent | (1) Not at all |  |
|  |  |  |  |  |  |  (1) Improve your access to healthcare services |
|  |  |  |  |  |  |  (2) Appropriate for your healthcare needs |
|  |  |  |  |  |  |  (3) An excellent solution for the COVID-19 period |
|  |  |  |  |  |  |  (4) The apps are easy to use |
|  |  |  |  |  |  |  (5) Save a lot of time and waiting in line |
|  |  |  |  |  |  |  (6) I am satisfied with my experience of a treatment session with medical staff via the internet |
|  |  |  |  |  |  |  (7) The online visits were identical in quality to in-person visits |
|  |  |  |  |  |  |  (8) I tried to enter an online treatment session but without success |
|  |  |  |  |  |  |  (9) I will continue to use telemedicine services for treatment sessions even after the pandemic |
|  |  |  |  |  |  |  (10) Overall, I am satisfied with the telemedicine services |

To what extent do you: Q4

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| (5) To a very large extent | (4) To a large extent | (3) To a moderate extent | (2) To a small extent | (1) Not at all |  |
|  |  |  |  |  |  (1) Know how to use the internet to respond to health-related questions |
|  |  |  |  |  |  (2) Know how to find useful healthcare information on the internet |
|  |  |  |  |  |  (3) Know how to use the healthcare information you found on the internet  |
|  |  |  |  |  |  (4) Know how to evaluate the healthcare information you find on the internet |
|  |  |  |  |  |  (5) Feel safe to use the information on the internet in order to make health-related decisions |
|  |  |  |  |  |  (6) Consume more healthcare related information on the internet since the outbreak of the COVID-19 pandemic |
|  |  |  |  |  |  (7) Look for information on the internet about the COVID-19 vaccine |

What is your date of birth? Q5 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is your gender? Q6

* (1) Male
* (2) Female
* (3) I prefer not to answer

Level of education: Q7

* (1) Elementary school/junior high
* (2) High school
* (3) Professional post-school
* (4) Academic

Where were you born? Q8

* (1) Israel
* (2) Former Soviet Union states
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(3) Other:

If you were not born in Israel, in what year did you make Aliyah? Q9 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Does your mobile phone have apps that help you manage or monitor your state of health (apps of health maintenance organization, tests, various health-related parameters)? Q10

* (1) Yes
* (2) No
* (3) I do not know
* (4) I do not possess a smartphone

How religious are you? Q11

* (1) Secular
* (2) Traditional
* (3) Religious
* (4) Ultra-orthodox