

# Telemedicine in clinical gastroenterology practice: what do patients prefer?

Adi Lahat  and Zina Shatz

*Ther Adv Gastroenterol*

2021, Vol. 14: 1–9

DOI: 10.1177/  
1756284821989178

© The Author(s), 2021.  
Article reuse guidelines:  
[sagepub.com/journals-  
permissions](https://sagepub.com/journals-permissions)

## Abstract

**Background:** The Coronavirus Disease 2019 pandemic has forced major changes on healthcare systems. Maintaining regular patients' surveillance became a major challenge. Telemedicine has been promoted as an economic and effective way for long distance patient care. Our aim was to study patients' acceptance and perspectives on telemedicine.

**Methods:** Patients scheduled for clinic appointments were offered telemedicine. Those who agreed were asked to fill in a questionnaire assessing their satisfaction with the medical consultation. Patients' demographic characteristics and answers were collected and reviewed.

**Results:** Out of 358 patients approached 71 agreed to use telemedicine. Of them, 59 completed the questionnaire and were included in the study. All patients' basic demographic data were collected. Patients' included in the study mean age was:  $43 \pm 16.3$  years, 35 (59.3%) women. Patients who chose not to use telemedicine were significantly older, mean age:  $61 \pm 15.2$  years ( $p=0.036$ ), 134 (46.7%) women. Most patients included (38; 64.4%) had inflammatory bowel disease (IBD). Most patients who chose not to use telemedicine were non-IBD patients (206, 72%). Fifty-one patients (86.4%) assessed their experience as 'good' or 'excellent'. Satisfied patients had significantly less time under medical follow-up (3.7 versus 6.1 years,  $p=0.028$ ) and tended to be younger ( $p$ =non-significant). Women were statistically significantly more satisfied than men (33 versus 18,  $p=0.05$ ). Advantages reported were 'time saving' (31.3%), accessibility (26.1%), availability (25%). The main disadvantage was absence of physical examination (70%).

**Conclusions:** Telemedicine gained a high satisfaction rate among patients under regular medical surveillance. Most patients stated this that method is convenient, time saving and increases their compliance. Patients who agreed to telecare were younger, and tended to be of female gender and experiencing IBD. Further studies are needed to characterize specific barriers to telecare usage.

**Keywords:** COVID-19 pandemic, preference, satisfaction, telecare, telemedicine

Received: 1 October 2020; revised manuscript accepted: 24 November 2020.

## Introduction

Since the recognition of an outbreak of the new coronavirus called Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV-2) In Wuhan, China in December 2019,<sup>1</sup> the infection spread rapidly around the world, until a world pandemic was declared by the World Health Organization on 11 March 2020.<sup>2</sup> The global Coronavirus Disease 2019 (COVID-19) outbreak exposed healthcare systems worldwide to multiple mega-challenges. One of the major challenges facing healthcare

providers was maintaining regular chronic treatment and medical follow-up with their patients in the face of reluctance and fear from physically arriving at medical centers. As in many other life fields, technology enabled modifications in medical follow-up habits. For many years, telemedicine has been promoted as an economic and effective way to enhance patient care. However, although technically feasible and available for use, it was not widely incorporated into regular gastroenterology practice.

Correspondence to:

**Adi Lahat**  
Department of  
Gastroenterology, Sheba  
Medical Center, Tel  
Hashomer, Sackler School  
of Medicine, Tel-Aviv  
University, Tel-Aviv, 52621,  
Israel  
[zokadi@gmail.com](mailto:zokadi@gmail.com)

**Zina Shatz**  
Department of  
Gastroenterology,  
Sheba Medical Center,  
Tel Hashomer, Israel,  
affiliated with Sackler  
School of Medicine, Tel  
Aviv University, Israel



Nevertheless, due to urgent need during the pandemic, telemedicine became the preferred follow-up option by both physicians and patients during the COVID-19 outbreak. Telemedicine is defined as providing healthcare services *via* distant communication technologies without physical contact with the patient.<sup>3</sup>

Telemedicine can be divided into various categories, which include monitoring, education, consultation and care.<sup>4</sup> Telemonitoring refers to follow-up *via* wearable or mobile applications that connect digitally to healthcare providers and directly monitor specific symptoms.<sup>5,6</sup> The use of telemonitoring is rapidly growing, and will probably perform a large part of future healthcare.

Education and consultation are well known methods for communication between healthcare providers among themselves or with their patients, and became widely used during this world pandemic as a part of social distancing policy, mainly as webinars and virtual meetings.

Telecare is the transmission of the traditional patient–physician physical meeting and interaction into remote connection using video transmission. The high prevalence of mobile phones and new technology of various high quality video applications enabled the wide use of this category. A study performed on 2012 in medical centers around the US reported active telecare programs in almost half of the centers.<sup>7</sup>

In gastroenterology, special attention was attributed towards providing telecare to patients with chronic disease, mainly inflammatory bowel disease (IBD).<sup>4,8,9</sup> In Israel, during the months February to April 2020 the SARS-CoV-2 infection rate increased rapidly among the general population, with specific severe outbreaks in religious ultra-orthodox Jewish communities.

Our center, a tertiary referral hospital in the center of Israel, serves a few of the largest religious ultra-orthodox cities. During this outbreak specific and dynamic regulations were published by the health ministry, with growing limitations on civilians' daily activities. State regulations regarding social distancing were gradually introduced during March 2020. All these changes necessitated rapid adaptation of local practice and accelerated the process of using telecare during daily patient surveillance.

Our current study is aimed at assessing patients' perspective and satisfaction with telecare practised during February–April 2020.

### Patients and methods

During March 2020, as state regulations forced general lockdown, all ambulatory activities at our gastroenterology department were changed accordingly. Patients scheduled for routine follow-up clinic visits were contacted by phone, and were offered the option to arrive at a face-to-face visit, reschedule for a later date or perform a telecare visit.

New patients that were not familiar with the physician were not offered the telecare option, as well as patients who according to their physician needed to be seen face to face. Alternative visits were scheduled for dates starting from 2 months' delay according to patients' preferences.

Telecare was performed using a specific secured virtual communication program, connected to the hospital's software and included a virtual conversation (for specific details see below under technical considerations).

Basic demographic characteristics (age, gender and diagnosis) of both groups (those who agreed to telemedicine and those who chose not to use this method) were collected.

All patients who performed the telecare visit were contacted by phone again, at a maximum 14 days following their visit, and were offered to fill in a questionnaire assessing their viewpoint and satisfaction with the virtual meeting.

Questionnaires assessed patients' general opinion on telecare medicine, asked for specific advantages and disadvantages of the method, patients' view on patient–physician connection using telecare and their will to continue using telecare in the future. Patients' demographic and clinical data were collected, and only patients who filled in more than 95% of the questionnaire were included for analysis.

### Technical considerations

All telecare visits were performed using the Datos Remote Care platform, which is incorporated into our medical centers' software medical files.

The platform has full food and drug administration (FDA), quality management system by FDA, software development life cycle, and health insurance portability and accountability compliance. Technically, the physician sends an invitation to perform a virtual visit *via* a link sent by SMS directly to the patient's mobile phone.

After pressing the link, the patient enters a virtual waiting room, from which he is invited into the virtual call by the physician. Patients' contact details are taken automatically from the computerized medical data files, unless the patient specifically supplies a different communication number.

Caregivers underwent a specific web-training program, aiming to provide both technical skills for operating the system, as well as basic specific tools for effective remote treatment. Both patients and caregivers were given a short illustrated instruction page explaining the technical process of communication. A specific in-hospital telemedicine team supplied technical support in cases of communication or operational problems.

#### *Ethical considerations*

This study has been approved by the local (Chaim Sheba Medical Center) ethics committee, approval number 7002-20-SMC. Informed consent was obtained from all study participants. Informed consent was obtained verbally and documented in research files.

#### *Statistical methods*

Continuous baseline variables described using mean, median, standard deviation, minimum and maximum. Categorical variables were described using frequency and percentage. The Mann-Whitney and Kruskal-Wallis non-parametrical tests for independent samples and the  $\chi^2$  test for categorical variables were used to compare characteristics of various subgroups.

All statistical analyses were performed using the SPSS program (IBM SPSS statistics version 25; IBM Corp., Armonk, NY, USA, 2015).

## **Results**

A total of 358 patients scheduled for clinic visits were contacted by phone and offered the option of

a virtual medical appointment. Of them, 71 patients chose that option, and 287 patients chose to re-schedule the meeting for a later date. All patients who experienced telemedicine were contacted by phone again up to 14 days following their visits and were asked to complete the satisfaction questionnaire. Fifty-nine patients completed the questionnaire fully and were included for analysis.

The mean age of the patients included in the study was 43 years  $\pm$  16.3 years, ranging from 19 to 76 years. There were 24 (40.7%) men and 35 (59.3%) women.

Patients who chose not to use telemedicine were significantly older, with a mean age of 61  $\pm$  15.2 years ranging from 25 to 83 years ( $p=0.036$ ). Of them, 134 were women (46.7%) and 153 (53.3%) were men.

Gender difference was not significant between the two groups.

Most patients included in the study (38; 64.4%) had inflammatory bowel disease (IBD), while the minority (21; 35.5%) were scheduled for follow-up appointment due to different gastrointestinal disease; (3, diverticular disease follow-up; 4, peptic disease follow-up; 12, polyps and colon cancer follow-up; 2, esophageal and gastric cancer follow-up). The mean age of IBD patients was 41.4 years  $\pm$  14.2, age ranging from 20 to 69 years, and that of non-IBD patients was 47 years  $\pm$  19.3, ranging from 19 years to 76 years. The age difference between IBD and non-IBD participants was not significant ( $p=0.278$ ).

Follow-up time was defined as the time period the patient is under surveillance by his treating physician. Mean follow-up time was 4 years  $\pm$  2.96, ranging from 1 to 15 years. The mean follow-up period did not differ significantly between men and women (3.71 and 4.27 years,  $p=0.51$ ); however, it was significantly different between IBD and non-IBD patients (2.62 and 4.83,  $p=0.003$ ).

Most patients who chose not to use telemedicine were non-IBD patients (206, 72%). Characteristics of patients included in the study are shown in Table 1.

Results analysis for specific questions are shown below.

**Table 1.** Patients' characteristics.

		All	Sex		IBD	
<i>n</i>			Men	Women	No IBD	IBD
		59	24	35	21	38
Age, years	Mean	43.44	45.13	42.29	47.14	41.39
	Median	40.00	40.00	43.00	48.00	39.50
	Standard deviation	16.33	18.88	14.51	19.35	14.27
	Minimum	19.0	20.0	19.0	19.0	20.0
	Maximum	76.0	76.0	70.0	76.0	69.0
<i>p</i>			0.616		0.278	
Follow-up, years	Mean	4.04	3.71	4.27	2.62	4.83
	Median	3.0	3.0	3.0	2.0	4.5
	Standard deviation	2.96	2.71	3.14	2.06	3.11
	Minimum	1.0	0.5	0.5	1.0	1.0
	Maximum	15.0	9.0	15.0	8.0	15.0
<i>p</i>			0.51		0.003	
IBD, inflammatory bowel disease.						

**Q1: How would you describe your experience with the remote medicine system?**

Fifty-one patients (86.4%) assessed their experience as 'good' or 'excellent', while eight patients (13.6%) were not satisfied with their experience and answered 'intermediate' or 'bad'. Satisfied patients tended to be younger, but results were not statistically significant (43 years *versus* 49 years,  $p=0.293$ ). Satisfied patients had significantly less time under medical follow-up (3.7 *versus* 6.1 years,  $p=0.028$ ). Women were statistically significantly more satisfied than men (33 *versus* 18 patients indicated satisfaction,  $p=0.05$ ); IBD diagnosis was not associated with satisfaction.

**Q2: How did you estimate the communication with your physician using the remote medicine system compared to face-to-face clinic visit?**

Fifty patients (84.7%) were satisfied with the communication compared to regular visits, while only nine patients (15.3%) were not satisfied. Age, gender, follow-up time or IBD diagnosis were not associated with patients' answers to this question.

**Q3: What is your opinion regarding the use of remote medicine for the long run?**

Most of the patients ( $n=49$ , 83.1%) evaluated the use of telemedicine in the future positively. Patients who supported the use of telemedicine for the long run were 10 years younger than patients who did not (42 years *versus* 52 years,  $p=0.093$ ). Answers were not associated with follow-up period or IBD diagnosis. Women tended to believe in telemedicine for a long term more often than men (91% *versus* 70%,  $p=0.074$ ).

**Q4: Were there any problems that prevented a full message exchange between you and your physician?**

Three patients (6.7%) reported technical communication problems with the doctor. Most of the patients ( $n=55$ , 93.2%) were satisfied with the communication with the doctor during the telemedicine appointment. Age, gender, time in follow-up or IBD diagnosis were not significantly associated with the responses.

**Table 2.** Summary of telecare disadvantages reported by patients.

Disadvantage	No. of confirmative answers	Percentage
Not effective	2	4.65
Cannot show documents	4	9.30
No meeting summary	2	4.65
Poor communication	1	2.33
Uncomfortable providing personal information over the phone	2	4.65
No physical examination	30	69.77
No reminder for appointment	1	2.33
Not personal	1	2.33
Total	43	100

*Q5: Do you see disadvantages in a virtual medical meeting?*

Eighteen patients (30.5%) did not report any disadvantage, and 41 patients (69.5%) reported one to four disadvantages. Age, gender, follow-up time or IBD diagnosis were not significantly associated with responses. A summary of patients' responses is shown in Table 2.

*Q6: Do you see advantages in remote medicine?*

Fifty-five patients (93.2%) specified at least one advantage in telemedicine; four patients (6.8%) did not indicate a single advantage of telemedicine.

There was no difference between genders. Among the advantages, 'time saving' appeared 54 times (31.3%), accessibility 45 times (26.1%), prevents absence from work 38 (22%), availability 35 (25%). Responses were not associated with age, gender, follow-up time or IBD diagnosis.

Patients who did not find any advantage were on average 10 years older than those who reported one or more advantages of telemedicine. However, results were not statistically significant ( $p=0.283$ ). Neither follow-up time, gender nor IBD diagnosis were associated with patients' opinions.

*Q7: Did telecare improve your compliance with medical follow-up?*

Two-thirds of the participants ( $n=38$ , 65.5%) claimed that telemedicine improved their compliance with follow-up, compared to 20 participants (34.5%) who did not support this statement.

Age, follow-up time and IBD diagnosis did not affect patients' opinions. However, men reported improved compliance significantly more often than women (82.6% versus 54.3%,  $p=0.047$ ).

*Q8: Were there any procedural problems in obtaining reimbursement from your medical insurance?*

Only two patients (3.4%) experienced procedural difficulties while obtaining the payment obligation from an insurance company (Health Maintenance organization). These patients were a man and a woman, 58 and 70 years old, which differed from the mean age of those who did not report any problems (mean age 42 years,  $p=0.087$ ). Results did not reach statistical significance.

*Q9: Do you see it as an advantage not to arrive physically at the medical center?*

Most of the participants preferred not to arrive physically at the medical center ( $n=49$ , 83.1%). No association with age, gender, IBD diagnosis or follow-up time was detected.

*Q10: Would you like to continue with telecare in the future?*

Only 43 patients answered this question. Out of 43 responses, 36 (83.7%) would like to continue using telemedicine in future. Thus, most of the patients would like to continue with no regards to age, gender, IBD or follow-up period.

**Table 3.** Total satisfaction score adjusted to follow-up period.

Model 1	Unstandardized coefficients		Standardized coefficients	t	Sig.	95% confidence interval for B	
	B	Standard error	Beta			Lower bound	Upper bound
(Constant)	84.685	9.336		9.070	0.000	65.975	103.396
Sex	4.794	4.231	0.145	1.133	0.262	-3.686	13.274
Age, years	-0.158	0.130	-0.157	-1.209	0.232	-0.419	0.104
Follow-up period (years)	-1.292	0.720	-0.234	-1.795	0.078	-2.734	0.150

**Table 4.** Total satisfaction score adjusted to IBD diagnosis.

Model 2	Unstandardized coefficients		Standardized coefficients	t	Sig.	95% confidence interval for B	
	B	Standard error	Beta			Lower bound	Upper bound
(Constant)	84.951	10.227		8.307	0.000	64.456	105.446
Sex	3.976	4.314	0.121	0.922	0.361	-4.670	12.622
Age, years	-0.217	0.133	-0.217	-1.637	0.107	-0.483	0.049
IBD diagnosis	-2.461	4.475	-0.073	-0.550	0.585	-11.429	6.508

IBD, inflammatory bowel disease.

#### Total satisfaction score

Finally, we combined the responses of all 10 questions into a total satisfaction score. All results were calculated with a similar weight. The proportion of answers in favor of telecare compared to the number of total questions answered was calculated for each patient.

We created a regression model for prediction of the total satisfaction score adjusted to age, gender and IBD diagnosis or years under follow-up. As the last two are correlated (Pearson correlation coefficient 0.4,  $p=0.002$ ), we created two different models.

Tables 3 and 4 show both models for the total satisfaction score depending on follow-up period<sup>3</sup> and IBD diagnosis.<sup>4</sup>

From both models we conclude that overall satisfaction with telecare was inversely related to age (not statistically significant), women tended to be three to four times more satisfied with the process (not statistically significant), and that patients with longer follow-up tended to be less satisfied with telecare (close to statistically significant  $p=0.078$ ).

#### Discussion

During the past decades advanced technology has become an important part of daily life and medical practice. Telemedicine, defined as a 'two-way, real time interactive communication between the patient and the physician or practitioner at distant site and includes, at the minimum, audio and video equipment'<sup>10</sup> indicated long distance medical visits contacted by bilateral video interaction. The technology has been available for years, but was not commonly used during daily practice in the gastroenterology field. However, the SARS-CoV-2 pandemic forced rapid changes and adjustments on the entire medical system, and long distance patient surveillance when applicable became a major need. Practical guidelines to telemedicine usage were published,<sup>11</sup> and both patients and physicians became more aware and willing to experience this communication method. Herein, we describe patients' perception and acceptance of this new technology for regular clinic visits.

In our current study, we actively contacted patients scheduled for follow-up visits during the general lockdown and offered them the opportunity to

participate in an online visit. We chose to offer a virtual meeting only to patients who were under long-term follow-up, because we believe it is necessary to perform a complete baseline physical examination and to establish patient–caregiver trust before moving to virtual meetings. Furthermore, virtual meetings were scheduled only after receiving treating physicians’ approvals, as most physicians agreed that a specific meeting mandates a face-to-face appointment (e.g. delivering a bad pathological diagnosis, receiving important therapeutic decisions, etc.). As shown by our results, only approximately 20% of patients approached chose to use telemedicine. Basic demographic characteristics differed between patients who approved or resisted telemedicine. Hence, patients who chose not to conduct virtual meetings were significantly older than patients who agreed to this form of medical visit. Moreover, these patients were less likely to have IBD.

Our results are in line with the current literature, identifying age as one of the most prevalent barriers towards adopting telemedicine.<sup>12</sup> The age barrier was specified as originating from a lack of exposure and fear of new technologies.<sup>12–14</sup>

Herein, IBD patients were much more likely to accept the virtual meeting. As in our medical center patients with chronic hepatic or oncological diseases are treated in other departments, IBD is by far the most prevalent chronic disease among our patients. Therefore, our results correlate with data in the literature showing that telemedicine is especially useful to patients with chronic gastrointestinal disease who require regular and frequent visits.<sup>11,15,16</sup>

Correlating with current data, we found that women were more likely to accept virtual medicine.<sup>14</sup> Women were shown to have higher engagement in healthcare-related online activities, as well as being more active in general social media.<sup>17–19</sup>

Generally, most of our patients were satisfied with telemedicine. Eighty-six per cent of our patients assessed their experience as ‘good’ or ‘excellent’. Our results correlate with data in the literature, that report up to 94–96% satisfaction rate with all telehealth attributes.<sup>20,21</sup> In agreement with our findings, women were shown to have a higher satisfaction rate,<sup>20</sup> with an odds ratio of 1.68 in one study.

Along this line, women in our study supported the long-term use of telemedicine statistically significantly more than the men (91% *versus* 70%,  $p=0.074$ ). Furthermore, the age influence was shown here again as patients who supported long-term telemedicine were 10 years younger than those who did not (42 years *versus* 52 years,  $p=0.093$ ).

In agreement with the current literature, in which patients mentioned convenience (55%), travel (34%), and time saving (22%) as their main motivations,<sup>21</sup> our patients reported time saving (31.3%), accessibility (26.1%), prevents absence from work (22%) and availability (25%) as the main advantages.

Importantly, two-thirds of our patients stated that telemedicine improved their compliance with medical surveillance. Interestingly, male patients reported compliance improvement significantly more than women (82.6% *versus* 54.3%,  $p=0.047$ ).

Another finding was that patients with a longer follow-up history tended to be less satisfied with telemedicine. This was an independent factor, and might result from preference for more personalized communication in patients who got used to that form of medical treatment during a long-term follow-up period.<sup>22</sup>

Our patients mentioned few disadvantages with telecare. The most common was the absence of physical examination. In the context of IBD patients with disease exacerbation this is indeed a major drawback. Other disadvantages were mainly technical and were much less common.

Careful planning and improved technical infrastructure might overcome these disadvantages. Our study had several limitations. First, we only included patients who agreed to participate in a telecare visit in our questionnaire. Although the questionnaire was aimed at assessing patients’ satisfaction and acceptance of telecare, we believe that revealing the reasons for non-acceptance are at least as important, and compel further studies.

Second, our patient group was relatively small, and therefore in some cases results did not reach statistical significance. However, we believe our results represent patients’ opinions because we

had a wide demographic diversity and our results fully correlate with current data in the literature.

Our study was designed to assess patients' perspective and acceptance of virtual meeting. Caregivers' perspective was not addressed in this study, and merits further investigations. However, this important issue was discussed in a recently published review.<sup>23</sup> In this review the authors summarized the results of several studies, and stated that many physicians are reluctant to use online consultation, mainly because they fear the online visit might be more time consuming and a threat to confidentiality. Furthermore, although many physicians stated they encourage patients' participation, most of them did not act accordingly in a real-life setting.

In conclusion, telecare gained a high satisfaction rate among patients under regular medical surveillance at our gastroenterology department. Most patients stated this method is convenient, time saving and increases their compliance with regular follow-up. The most common disadvantage reported by patients was the absence of physical examination. Patients who agreed to telecare tended to be younger, of female gender and with IBD. Further studies are needed to characterize specific barriers to telecare usage in order to achieve full integration of this method in healthcare therapeutic tools.

#### Authors' note

The manuscript, including related data, figures and tables has not been previously published and that the manuscript is not under consideration elsewhere.

#### Author contributions

Both authors have made substantial contributions to all of the following: (a) the conception and design of the study, or acquisition of data, or analysis and interpretation of data; (b) drafting the article or revising it critically for important intellectual content; (c) final approval of the version to be submitted.


#### Conflict of interest

The authors declare that there is no conflict of interest.

#### Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

#### ORCID iD

Adi Lahat  <https://orcid.org/0000-0003-1513-7280>

#### Supplemental material

Supplemental material for this article is available online.

#### References

1. World Health Organization. *Pneumonia of unknown cause – China*. <https://www.who.int/csr/don/05-january-2020-pneumonia-of-unknown-cause-china/en> (accessed 15 March 2020).
2. World Health Organization. *WHO Director-General's opening remarks at the media briefing on COVID-19 – 11 March 2020*. <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19—11-march-2020> (accessed 15 March 2020).
3. Aguas Peris M, Del Hoyo J, Bebia P, *et al*. Telemedicine in inflammatory bowel disease: opportunities and approaches. *Inflamm Bowel Dis* 2015; 21: 392–399.
4. Siegel CA. Transforming gastroenterology care with telemedicine. *Gastroenterology* 2017; 152: 958–963.
5. Spiegel B. 2015 American Journal of Gastroenterology lecture: how digital health will transform gastroenterology. *Am J Gastroenterol* 2016; 111: 624–630.
6. Riaz MS and Atreja A. Personalized technologies in chronic gastrointestinal disorders: self-monitoring and remote sensor technologies. *Clin Gastroenterol Hepatol* 2016; 14: 1697–1705.
7. Adler-Milstein J, Kvedar J and Bates DW. Telehealth among US hospitals: several factors, including state reimbursement and licensure policies, influence adoption. *HealthAff (Millwood)* 2014; 33: 207–215.
8. Hommel KA, Hente E, Herzer M, *et al*. Telehealth behavioral treatment for medication nonadherence: a pilot and feasibility study. *Eur J Gastroenterol Hepatol* 2013; 25: 469–473.
9. Li S, Thompson K, Peterson T, *et al*. Delivering high value IBD Care through telemedicine visits. *Gastroenterology* 2016; 150: S792.
10. Centers for Medicare and Medicaid Services. *Telemedicine*. <https://www.medicare.gov/medicaid/benefits/telemed/index.html> (accessed 15 March 2020).
11. Shah ED, Amann ST and Karlitz JJ. The time is now: a guide to sustainable telemedicine during



- COVID-19 and beyond. *Am J Gastroenterol* 2020; 115: 1371–1375.
12. Scott Kruse C, Karem P, Shifflett K, *et al.* Evaluating barriers to adopting telemedicine worldwide: a systematic review. *J Telemed Telecare*. 2018; 24: 4–12.
  13. Kontos E, Blake KD, Chou WY, *et al.* Predictors of eHealth usage: insights on the digital divide from the Health Information National Trends Survey 2012. *J Med Internet Res* 2014; 16: e172.
  14. Van Deursen AJ and van Dijk JA. Internet skills performance tests: are people ready for eHealth? *J Med Internet Res* 2011; 13: e35.
  15. Cross RK, Langenberg P, Regueiro M, *et al.* A randomized controlled trial of TELEmedicine for patients with Inflammatory Bowel Disease (TELE-IBD). *Am J Gastroenterol* 2019; 114: 472–482.
  16. Su GL, Glass L, Tapper EB, *et al.* Virtual consultations through the Veterans Administration SCAN-ECHO project improves survival for veterans with liver disease: virtual consultations through the Veterans Administration. *Hepatology* 2018; 68: 2317–2324.
  17. Fox S and Jones S. *The social life of health information*. Washington, DC: Pew Internet & American Life Project, 2009.
  18. Fox S and Purcell K. *Chronic disease and the internet*. Washington, DC: Pew Internet & American Life Project, 2010.
  19. Fox S and Duggan M. *Health online*. Washington, DC: Pew Internet & American Life, 2013.
  20. Polinski JM, Barker T, Gagliano N, *et al.* Patients' satisfaction with and preference for telehealth visits. *J Gen Intern Med* 2016; 31: 269–275.
  21. Soegaard Ballester JM, Scott MF, Owei L, *et al.* Patient preference for time-saving telehealth postoperative visits after routine surgery in an urban setting. *Surgery* 2018; 163: 672–679.
  22. Robben SH, Perry M, Huisjes M, *et al.* Implementation of an innovative web-based conference table for community-dwelling frail older people, their informal caregivers and professionals: a process evaluation. *BMC Health Serv Res* 2012; 12: 1.
  23. Kernebeck S, Busse TS, Böttcher MD, *et al.* Impact of mobile health and medical applications on clinical practice in gastroenterology. *World J Gastroenterol* 2020; 26: 4182–4197.

Visit SAGE journals online  
[journals.sagepub.com/  
 home/tag](https://journals.sagepub.com/home/tag)

 SAGE journals