

Satisfaction with telemedicine use during COVID-19 pandemic in the UK: a systematic review

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ABSTRACT

Background: Telemedicine became a fundamental part of healthcare provision during COVID-19 pandemic. An evaluation of telemedicine-associated satisfaction helps the service develop more viable applications. This review evaluated the satisfaction of healthcare users and providers and their willingness to use this modality in future.

Methods: The study was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses. A search on empirical articles published between March 2020 and December 2022 was performed on 'PubMed' and 'Scopus' databases. Findings that reported on satisfaction of patients, families and caregivers as well as clinicians were extracted and analysed. Quality of included studies was assessed. After applying inclusion and exclusion criteria, the review included 27 eligible studies.

Results: Data was found from a variety of emergency and non-emergency departments of primary, secondary, and specialised healthcare. Almost all studies were undertaken within the NHS. There were many tools that measured satisfaction. Satisfaction was high among recipients of healthcare, scoring 9–10 on a scale of 0–10 or ranging from 73.3% to 100%. Convenience was rated high in every specialty examined. Satisfaction of clinicians was high throughout the specialties despite connection failure and concerns about confidentiality of information. Nonetheless, studies reported perception of increased barriers to accessing care and inequalities for vulnerable patients especially in older people. In general, willingness to use telemedicine in future was high in the recipients as well as the providers of healthcare.

Conclusion: COVID-19 pandemic has transformed healthcare in the UK and promoted a revolution in telemedicine applications. Satisfaction was high among both recipient and provider of healthcare. Telemedicine managed to provide a continued care throughout the pandemic while maintaining social distance. The current review presented commendable evidence to encourage different specialities to engage in telemedicine application.

ARTICLE HISTORY

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KEYWORDS



Telemedicine; COVID-19; satisfaction; willingness; healthcare; UK

1. Background

Telemedicine is an integrated system of healthcare delivery using a wide range of technologies [1–3]. Telemedicine refers to the use of electronic information and telecommunication technologies to support and promote distance clinical care, patient health education and public health [2,4,5]. The application of telemedicine can reduce the burden on the healthcare systems, reduce the need for personal protective equipment and protect patients as well as healthcare workers from the spread of the infection [6]. Furthermore, virtual clinics save time and cost associated with travel. Guided by the international surge of personal technology and the wide availability of internet access, the World Health Organization launched the global strategy on digital health 2020–2025, suggesting digital health to be among global health priorities to benefit people in an ethical, safe, secure, reliable, equitable and sustainable way [7].

Typically, telemedicine is fully integrated into a national health system to provide comprehensive and continuous care [8]. Different strategic models and frameworks were suggested to create this continuity of care through telemedicine [9,10].

Before COVID-19 pandemic, telemedicine was advocated to enable access to healthcare, health information and medical records [11]. The UK was among the countries who pioneered the utilisation of telemedicine. Different products and communication tools were developed and applied both for synchronous and asynchronous healthcare services. In the UK, NHS Digital represents the main online service that enable patient records, electronic prescriptions, e-referrals and many other services. Additionally, it manages the NHS public educational website. To achieve the continuity of care, portals and applications were developed to improve the connection between health service users and providers. For example, 'Patient Access' which is a programme that

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connects patients to their general practice to aid accessing information on promoting health and preventing disease, booking a consultation, ordering repeated medication and checking medical records [12]. Despite the progress in various telemedicine aspects, the universal application of this technology was triggered by COVID-19 pandemic where abrupt transition from face-to-face to telemedicine was mandated globally. This harm reduction strategy was applicable to all healthcare services unless there was an exceptional need for in-person care. Therefore, the demand for telemedicine on different medical specialities was suddenly increased and many users who may traditionally reject telemedicine, were motivated to uptake this experience. This major shift in the delivery of healthcare services in the UK was accompanied with challenges to the quality of care and satisfaction of healthcare recipient as well as healthcare provider. Assessing user satisfaction with telemedicine is fundamental to successful telemedicine. Nonetheless, satisfaction within the healthcare context is a complex clinical construct by itself. It integrates factors related to recipient of the services, the medical condition, the healthcare provider, the provided medications/procedures/surgeries, the clinic physical settings and the technology used. Therefore, best methodological approaches to quantify patient satisfaction is still debated. In 1983, Ware et al. provided an updated version of patient satisfaction survey and highlighted that satisfaction is subjective, but still mirror the realities of care to a substantial extent and [13]. Therefore, interpretation of patient rating reflects subjective preferences and expectations [13]. Ware et al. outlined eight dimensions of patient satisfaction including, art of care, professional competence, accessibility/convenience, finances, physical environment, availability, continuity and efficacy/outcome of care [13]. Therefore, a critical assessment of telemedicine applications in different specialities is imperative to optimise the healthcare provided through this strategy. This assessment can bridge the gaps in healthcare fulfilment and improve this service to meet user expectation. On the other hand, examining satisfaction of clinicians is key in recognising the challenges affected healthcare providers to achieve wider use of telemedicine services. Therefore, this systematic review aims to evaluate the satisfaction with the use of telemedicine during COVID-19 pandemic in a range of applications to help optimising further application beyond the pandemic.

2. Methodology

2.1. Search strategy

The study was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-

Analyses (PRISMA) 2020 statement [14]. Initial search on PubMed was undertaken on December 1, 2022. It targeted information related to 'Telemedicine' on PubMed's Medical Subject Headings (Mesh). This has produced entry terms including (Tele-Referrals, Virtual Medicine, Tele Intensive Care, Tele ICU, Mobile Health, mHealth, Telehealth, eHealth, Remote Consultation, Telenursing, Telepathology, Teleradiology and Telerehabilitation). Keywords which were very specific such as (Tele Intensive Care, Tele ICU, Teleradiology and Telepathology) were excluded from the search strategy to maintain a broader research base. Other search words included 'COVID-19, Pandemic, Satisfaction, Convenience and Preference'. The search was guided by Population, Intervention, Outcome and Timing structure as follows:

- Population: patient, families, caregivers, paediatric, adult, and healthcare clinicians, therapist
- Intervention: application of telemedicine
- Outcome: satisfaction, acceptance, experience, preference, convenience
- Timing: healthcare delivery during COVID-19 pandemic (2020–2022)

The resultant keywords were entered into a search on PubMed and Scopus database on December 31, 2022 for a title search. The search applied 12 keywords indicating telemedicine and COVID-19. The search keywords were used in combination with using the Boolean selection AND/OR. The string produced is shown in [Textbox 1](#). This search produced 295 results which were later screened by abstract and title.

Textbox 1. Scopus search string.

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((TITLE ('Telehealth') OR TITLE ('Telemedicine') OR TITLE ('Teletherapy') OR TITLE ('Telephone-based') OR TITLE ('Video-based') OR TITLE ('Web-based') OR TITLE ('E-consults') OR TITLE ('E-health') OR TITLE ('eHealth') OR TITLE ('Electronic health') OR TITLE ('M-health') OR TITLE ('mHealth') OR TITLE ('Mobile health') OR TITLE ('Digital health') OR TITLE ('Video conference') OR TITLE ('Video consultation') OR TITLE ('Telephone consultation') OR TITLE ('Virtual consultation') OR TITLE ('Remote consultation') OR TITLE ('Remote healthcare')) AND ((covid OR sars-cov-2 OR coronavirus OR pandemic OR lockdown)) AND (LIMIT-TO (PUBSTAGE, 'final')) AND (LIMIT-TO (AFFILCOUNTRY, 'United Kingdom')) AND (LIMIT-TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2020)) AND (LIMIT-TO (DOCTYPE, 'ar')) AND (LIMIT-TO (LANGUAGE, 'English')) AND (LIMIT-TO (SRCTYPE, 'j'))).
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2.2. Eligibility criteria

Telephone and video telemedicine were of particular interest in this review as they are the standard media suggested to mediate remote consultations as defined by the NHS telemedicine guideline [15]. The outcome of interest was the satisfaction of users, including patients, families and caregivers as

well as the healthcare clinicians. The field of clinical practice included primary, secondary and specialised care in various specialties. Studies performed within the NHS or on private healthcare services were included. The search was limited to studies which were in English and took place in the UK. Timing was specified to include published studies investigating the use of telemedicine during COVID-19 pandemic. The date of search was limited to the years 2020–2022. Filters were applied to limit the search results to research that were peer-reviewed journal articles only. Prospective studies, cross-sectional studies and randomised controlled designs were included. Other research such as systematic reviews, meta-analyses, opinions and letters to the editors were excluded. Studies on other applications of telemedicine including teaching medics were excluded. Details on the inclusion and exclusion criteria are listed in Table 1.

Overall, 25 search words were identified, and the search string was obtained. Search terms were inserted into 'Scopus' and 'PubMed' with application of selected filters. Initial search produced 295 references on Scopus and 334 references on PubMed. After retrieving the studies into EndNote referencing manager, duplicates were identified and removed. Screening of the abstract was performed for all 334 studies to validate the inclusion. Studies focusing on effectiveness, or cost-effectiveness, or efficacy or effectiveness of telemedicine were removed ($n = 135$). Another 29 studies were excluded because they were not relevant to this review. Additional 22 studies were excluded because they were outside the UK. Another 65 were excluded because they have measured other outcomes of telemedicine but did not measure the satisfaction. Furthermore, all studies which were published before March 30, 2020, and were not evaluating the satisfaction with telemedicine at the time of COVID-19 pandemic, were excluded ($n = 13$). Four studies were excluded because they applied qualitative methodology. Two independent reviewers (WA & SAA) performed the search using the predesigned search strategy. Each reviewer reviewed the titles,

abstracts and full text of each retrieved study to ensure all inclusion criteria were valid. Finally, a total of 27 studies met all inclusion criteria, and these were selected to be included in this systematic review. Selection process was documented in a PRISMA flowchart (Figure 1).

2.3. Data extraction

Data was extracted by importing selected article information into an Excel spreadsheet for full-text viewing. Data imported were divided into columns denoting various parameters including title, abstract, research design, and area of healthcare service. Extracted data was recorded in data extraction form on Microsoft Word document. The full text of each article was reviewed, and data items were listed in the table. To give results a clear display, results from each article were summarised and divided into findings related to satisfaction, dissatisfaction and willingness to use telemedicine in the future.

2.4. Quality assessment and risk of bias

The quality and risk of bias of the articles used in the current systematic review were assessed using an adaptation of the risk of bias assessment evaluation tool by Cochrane [16]. This tool evaluated selection bias, detection bias, performance bias and reporting bias. A reason was documented for inclusion decision to gauge risk of bias and justify whether to include or exclude the study. Overall, no studies were excluded due to low quality or high risk of bias.

3. Results

The current systematic review included 27 studies that assessed satisfaction with the use of telemedicine during COVID-19 pandemic among utilisers and providers. Data was found from a variety of emergency and non-emergency departments of primary, secondary and specialised care. Studies targeted various age groups including children. The focus group of the included studies varied between patients, families and caregivers as well as clinicians. All studies were

Table 1. Inclusion and exclusion criteria.

Item	Inclusion criteria	Exclusion criteria
Population	Patient, families, caregivers, paediatric, adult, elderly Healthcare clinicians, therapist All UK	Other population Any place outside the UK
Intervention	Direct telemedicine services through phone, video, or both All abortion telemedicine services All levels of primary, secondary and specialised healthcare All diagnostic, management and rehabilitation telemedicine services	Other web-based telemedicine Face to face healthcare during COVID-19 pandemic Any supplementary health services such as laboratory or pharmacy services
Outcome Timing	Satisfaction, acceptance, experience, preference, convenience Healthcare interaction during COVID-19 pandemic Within the years 2020–2022	Other outcomes such as access, efficacy, cost and time effectiveness All studies that evaluated telemedicine before COVID-19 pandemic All studies before March 30, 2020

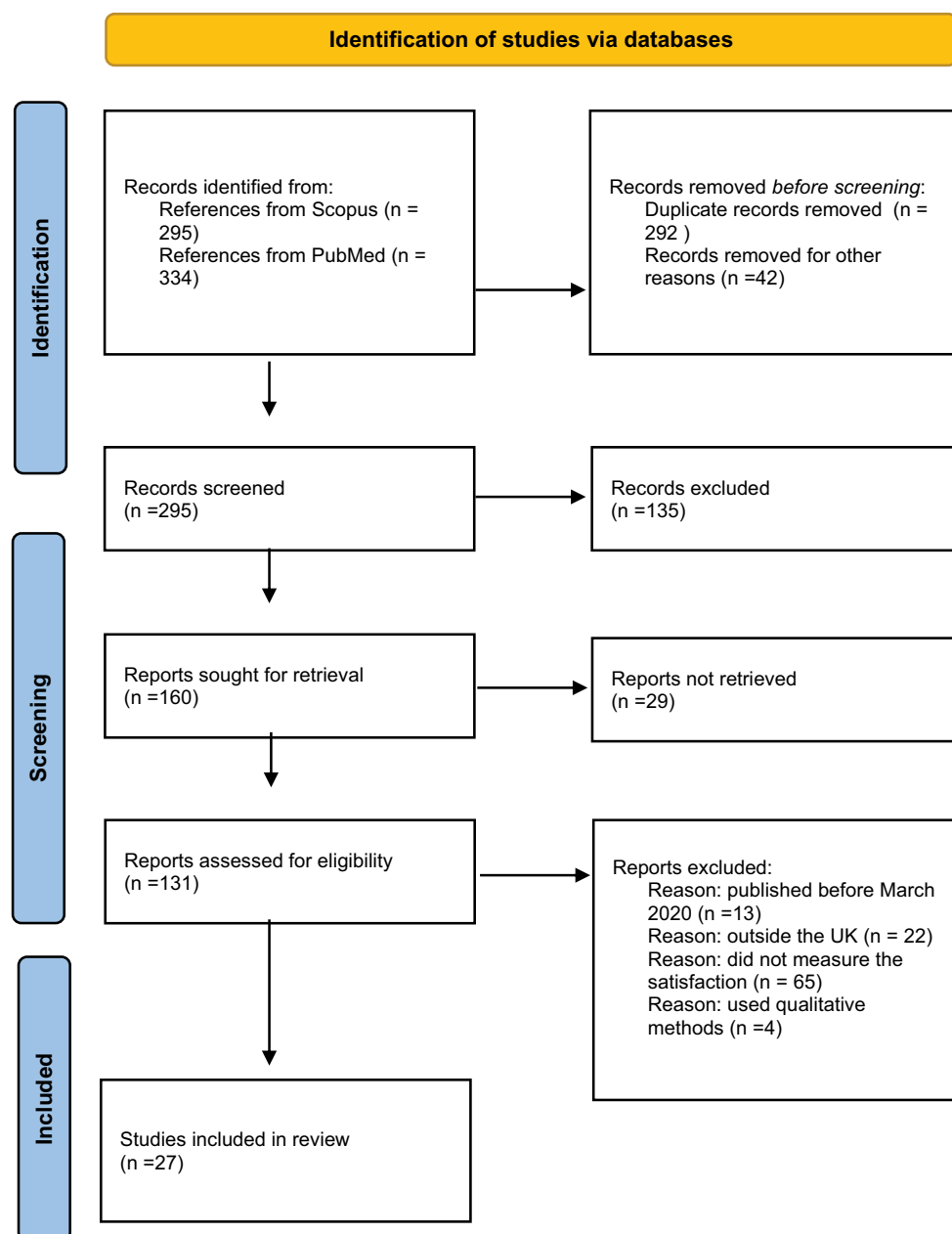


Figure 1. PRISMA graph for the process of systematic selection of studies [14].

undertaken in the UK within the NHS except of the study by Parmar, et al. [17], which surveyed a mix of public and private audiology services. The included studies were based on out-patient departments or hospitals. The included studies were primary research or service evaluation. The included studies were cross-sectional surveys and observational in nature. Three studies were cohort studies [18–20]. Four of the included studies used mixed methods [17,21–23] and the remaining were quantitative studies. Most studies evaluated the satisfaction of users of one specific clinical service except of 2 studies that examined various medical specialities [22,24]. All studies evaluated the satisfaction with telemedicine services in the context of COVID-19 pandemic. The method of telemedicine examined in the included studies was telephone and/or video consultations. Most included

studies reported satisfaction in the form of percentage of those who were satisfied or on Likert scale. Studies expressed satisfaction on a spectrum of themes, including; preference, ease of use, convenience, experience, acceptance, and perception. 18 studies investigated themes related to the willingness to use telemedicine in future or beyond the pandemic. The characteristics and the findings of the studies which were included in the current review are summarised in Table 2.

3.1. Medical specialities

Satisfaction with the use of telemedicine was reported on a range of medical departments and specialities. Apart from Elawady et al. and Makhecha et al. [22,24], all studies included in the current

Table 2. Study characteristics and findings related to satisfaction, dissatisfaction and willingness to use telemedicine in future.

Title of the study and year of publication	Medical specialty	Telemedicine format	Study design	Users examined and their number	Key results related to satisfaction	Willingness to use telemedicine in future	Key results related to dissatisfaction
Telemedicine During the COVID-19 Pandemic: Impact on Care for Rare Cancers 2020 (Smrke et al., 2020)	Oncology/ sarcoma	Telephone	Prospective cohort study	108 patients 18 Clinicians	High patient satisfaction with telemedicine (mean, 9/10) Patients considered telemedicine as saving time and cost of travel 30% of patients considered telemedicine as convenient 89% of clinicians felt telemedicine did not increase workload 83% of clinicians indicated lack of video-based assessment was a barrier to care	94% of clinicians indicated telemedicine should become part of regular practice 80% of patients wanted to utilise some telemedicine in future	A common concern among patients was breaking sensitive information via virtual media. 48% of patients would not want to hear bad news using telemedicine.
Learning from Crisis: a Multicentre Study of Oncology Telemedicine Clinics Introduced During COVID-19 2022 (Grant et al., 2022)	Oncology	Telephone	Mixed-methods survey	96 patients 15 clinicians	Most patients were satisfied with the format of telemedicine, time allotted to session, ability to ask questions and supportiveness (scored 10 on a scale of 0-10) 100% of patients were willing to receive blood tests via teleclinics 90.6% of patients were willing to receive favourable scan results via teleclinics Patients reported that telemedicine saved their time and reduced fatigue from travel 73.3% of clinicians agreed that telemedicine results in similar face-to-face clinics for the majority of patients	100% of clinicians agreed that telemedicine should have a place in routine oncology care 90.6% of patients stated that they would utilise teleclinics beyond the pandemic	Patients with hearing loss/ language difficulties may struggle with telephone-based teleclinics
Telemedicine during COVID-19: a survey of Health Care Professionals' Perceptions 2020 (Elawady et al., 2020)	Various medical specialties	Phone/ videoconferencing	Survey	132 clinicians (114 doctors 18 nurses and midwives)	> 60% of clinicians were satisfied with the level of care provided to patients 58% of clinicians thought patients were satisfied with the care provided via telephone consultation 73% of clinicians felt that patients understood their medical condition and the instruction given to them over the phone 70% of clinicians agreed that videoconference consultation would add to patient care	95% of clinicians reported that they received no training prior to engaging in telemedicine clinics 64% of clinicians were unaware of the updated General Medical Council guidance concerning remote consultations 37% of clinicians were unable to access patient records	
Patient Satisfaction with the Use of Telemedicine in the Management of Hyperthyroidism 2020 (Kaur et al., 2020)	Endocrinology Hyperthyroidism	Telephone follow-up	Survey	65 patients	97% of patients were satisfied with the quality of telemedicine services in the management of hyperthyroidism 100% of patients agreed that telephone follow-up provided a timely and convenient service	Patients suggested the provision of adequate timeslots, occasional face-to-face appointments and the introduction of text messaging and emailing to the telemedicine services	

(Continued)

Table 2. (Continued).

Title of the study and year of publication	Medical speciality	Telemedicine format	Study design	Users examined and their number	Key results related to satisfaction	Willingness to use telemedicine in future	Key results related to dissatisfaction
Tele-Gastroenterology Midst COVID-19 Pandemic: Patients' Perspective 2021 (Rahman et al., 2021)	Gastroenterology and hepatology	Telephone	Survey	98 patients	77.5% of patients were satisfied with their teleconsultations 60% of patients who were 70-79 years old were satisfied with teleconsultations Reasons for positive experience with telemedicine included avoiding cost and time of travel 77.3% of patients who were on follow-up clinic were satisfied with telemedicine, while only 46.9% of new patients who were satisfied with telemedicine 85% of patients described their experience of allergy telemedicine as 'good' or 'very good' 91% of patients felt the duration of the non-face-by-face consultation was 'about right' 75% of patients felt that were able to get everything out of their non-face-to-face appointment as they would in a face-to-face session 90% of patients felt appropriately involved in decision about their care when used telemedicine		17% of the participants felt that they were unable to ask questions
Synchronous Telemedicine in Allergy: Lessons Learned and Transformation of Care During COVID-19 Pandemic 2021 (Thomas et al., 2021)	Allergy medicine	Telephone and video	Survey Retrospective review	122 patients			Patients reported low audio quality and impersonal care during telemedicine consultations
Telemedicine in rheumatology: a mixed methods study exploring acceptability, preferences and experiences among patients and clinicians 2022 (Sloan et al., 2022)	Rheumatology	Telephone	Mixed methods/ survey and interviews	1340 patient survey 29 clinician survey	Patients and clinicians rated telemedicine as worse than face-to-face consultations in most of the categories asked More than 60% of patients and clinicians found telemedicine more convenient 86% of patients and 93% of clinicians rated telemedicine as worse than face-to-face for assessment accuracy		Clinicians perceived telemedicine to have increased misdiagnoses, inequalities and barriers to accessing care. Clinicians viewed telemedicine to have increased the inequalities among vulnerable and/ or disadvantaged patients
Patient Experiences With Telemedicine in a National Health Service Rheumatology Outpatient Department During Coronavirus Disease-19 2021 (Jones et al., 2021)	Rheumatology	Telephone	Survey	297 patients	52% and 24% of patients were either agreeing or strongly agreeing that they were satisfied with their telemedicine consultations respectively 78% of patients felt that an adequate assessment was completed via telemedicine 93% of patients found telemedicine easily accessible 77% of patients felt safer to have teleconsultation at home	60% of patients would be happy to have future follow-up teleconsultation Higher proportion of older aged patients were dissatisfied with telephone consultations and unlikely to have accessibility to video consultation or preferentially opt for this modality 89% of patients would prefer to have the option of deciding between a face-to-face or telephone consultation	

(Continued)

Table 2. (Continued).

Title of the study and year of publication	Medical speciality	Telemedicine format	Study design	Users examined and their number	Key results related to satisfaction	Willingness to use telemedicine in future	Key results related to dissatisfaction
Telehealth tinnitus therapy during the COVID-19 outbreak in the UK: uptake and related factors 2021 (Aazh et al., 2021)	Audiology-Cognitive Behavioural Therapy (CBT) for tinnitus	Video cognitive behavioural therapy	Survey Retrospective service evaluation	113 patients	Cognitive behavioural therapy for tinnitus management via telemedicine was acceptable in 80% of patients.		20% of patients declined telemedicine CBT for tinnitus management. The main reasons for declining include: • Not having access to a suitable device • The belief that telemedicine appointments would not be useful • Having advanced hearing loss • Anxiety concerning video calls Patients who declined telemedicine tended to be older. High tinnitus annoyance as measured via the visual analogue scale increased the chance of declining appointments by a factor of 1.4 (p = 0.019).
The impact of COVID-19 on provision of UK audiology services & on attitudes towards delivery of telehealth services 2022 (Parmar et al., 2022)	Audiology	Phone and video	Mixed methods survey	323 clinicians	92% of public and 75% of private healthcare professionals reported feeling comfortable conducting remote consultations.		Clinicians reported barriers such as access to the internet, poor technology skills, lack of knowledge about telemedicine protocol in audiology and concerns about confidentiality
The impact of the corona virus (COVID-19) pandemic on elective paediatric otolaryngology outpatient service 2020 (Darr et al., 2020)	Paediatric otolaryngology	Telephone and video	Survey	200 parents/ caregivers of paediatric patients	≥98% of patients gave a positive review of telemedicine consultations. 81% of patients voted 'strongly agree' to recommend remote consultation. 99% of respondents agreed within the domains of doctor-patient relationship as well as privacy and trust. 85% strongly agree on the domains of involvement 86% strongly agree on the domains of feeling listened to 87% strongly agree on the domains of ease and politeness	90% of participants reported that they would use video consultations in the future.	53% of patients/ caregivers disagreed for using video in remote consultations Parents/ caregivers preferred a telephone call because of the simplicity

(Continued)

Table 2. (Continued).

Title of the study and year of publication	Medical specialty	Telemedicine format	Study design	Users examined and their number	Key results related to satisfaction	Willingness to use telemedicine in future	Key results related to dissatisfaction
Patient and family perceptions of the provision of medicines as part of virtual outpatient consultations for children during COVID-19 2022 (Makhecha et al., 2022)	Children from various medical specialities	Telephone and video Receive medication at home/ local pharmacy	Survey Mixed methods	71 families of paediatric patients	96% median patient satisfaction rate (range 67%– 100%). Families reviewed the following as valuable: • Receiving medications directly to patient's address • Access to medicines information helplines • Information provided by pharmacists • Patients who received medication to their address reported high convenience Families with patients who require a lot of equipment to travel reported the ease of using telemedicine	11% of families expressed some frustration towards the process	
Virtual voice clinics in the COVID-19 era: have they been helpful? 2021 (Watters et al., 2021)	Speech and language therapy (SALT)	Telephone	Survey	75 patients	98% of patients were satisfied with the virtual method of consultation. 98% of patients had prior communication in advance of their appointment. 89% of patients feeling that the duration of the teleconsultation was adequate 60% of patients reported that the virtual method of consultation had been satisfactory in addressing their health needs	83% would like the option of a virtual type of clinic in the future	84% believed they would still benefit from face-to-face review The median time for those who were not satisfied was 10mins
Client satisfaction and experience of at British Pregnancy Advisory Service: A cross-sectional evaluation 2020 (Meurice et al., 2020)	Obstetrics/ Abortion	Phone/ video clients chose to receive medicines by mail or collect them from a nearby clinic for home use.	Survey British Pregnancy Advisory Service (BPAS) a web-survey 2 to 3 weeks postabortion	1333 patient	96.9% of patients who used abortion medicines for home use were satisfied or very satisfied. Being "very satisfied" was associated with parity (aOR 1.53, 95% CI 1.09 –2.14) and pain control satisfaction (aOR 2.22, 95% CI 1.4 4 –3.4 4) Health care provider contact was reported by 14.7%; mainly to BPAS' telephone after care service (76.8%).	77.8% would prefer home use of mifepristone and misoprostol 74.3% would prefer consultation by phone in future	1.6% of patients needed more guidance for home use of abortion medication 8.4% of patients were unsatisfied with pain control
Effectiveness, safety and acceptability of no-test medical abortion (termination of pregnancy) provided via telemedicine: a national cohort study 2021 (Aiken et al., 2021)	Obstetrics/ abortion	Telephone or video hybrid model for abortion	Cohort of patients who used the service	2453 patients	96% of patients were satisfied or very satisfied about their telemedicine abortion experience and care or that it was their preferred option	80% reported that they would choose telemedicine in the future	13% choosing in-person care

(Continued)

Table 2. (Continued).

Title of the study and year of publication	Medical speciality	Telemedicine format	Study design	Users examined and their number	Key results related to satisfaction	Willingness to use telemedicine in future	Key results related to dissatisfaction
Acceptability of no-test medical abortion provided via telemedicine during Covid-19: analysis of patient reported outcomes 2021 (Erlank et al., 2021)	Obstetrics/ abortion	Telephone	Prospective cohort study	1243 patients	84.2% of patients rated overall patients' satisfaction as 'very good'. 98.1% of patients rated their abortion experience as good/ very good 92.4% of patients felt as though they were provided with enough education and information to take medications at home for abortion. 99.3% of patients felt they could ask all the questions they wanted to.	66% of patients indicated that they would choose telemedicine in future 4.9% of patients reported they would prefer a video link in the future.	16.2% of patients would have preferred face-to-face appointments 2.2% of patients received no enough information on taking the medication 12.6% of patients reported concerns about the safety of self-administration of medications 3% of patients were not confident that they had passed the pregnancy
Agile Application of Video Telemedicine During the COVID-19 Pandemic 2020 (Dahri et al., 2020)	Surgery	Video	Survey	43 patients 79 clinicians	95.3% of patients reported a positive experience 100% of patients thought that the video telemedicine solution met their needs 100% of patients found joining the video consultation easy >90% of clinicians were satisfied with sound and video quality	93% of patients recommended to use telemedicine for future consultations	25% of clinicians believed that patient experience of a video consultation was worse than a face-to-face appointment
Telemedicine in oculoplastic and adnexal surgery: clinicians' perspectives in the UK 2022 (Kang et al., 2022)	Oculoplastic and adnexal surgery	Telephone and Video	Survey	45 clinicians	64.5% of clinicians were satisfied with the impact of telemedicine 66.7% of clinicians reported telemedicine confidence levels of 6 out of 10 53.3% of clinicians were satisfied at 7/10 or higher with establishing patient rapport 57.8% of clinicians were satisfied at 6/10 or higher with information they procured to reach a diagnosis 77.8% of clinicians preferred a mixture of face-to-face and telemedicine approaches	70.4% of clinicians foresee themselves continuing with telemedicine in future	Clinicians concerned about establishing good rapport with patients and full visualisation of patients Clinicians reported lack of administrative support with telemedicine Clinicians reported that some patients have poor access to digital technology
Teleophthalmology and COVID-19: the patient perspective 2021 (Golash et al., 2021)	Ophthalmology	Telephone and video	Survey	120 patients 80 telephone and 40 video consultation	71.3% of patient who used telephone consultation scored 10/10 on satisfaction scale 72.5% of patients who used video consultation scored 10/10 on satisfaction scale 55% of patients who used telephone and 82.5% of those who used video consultation felt face-to-face reviews would not have changed the appointment outcome.		62.5% of patients aged >65 years preferred face-to-face consultations while only 18.8% of 25-64years-old who preferred face -to-face

(Continued)

Table 2. (Continued).

Title of the study and year of publication	Medical speciality	Telemedicine format	Study design	Users examined and their number	Key results related to satisfaction	Willingness to use telemedicine in future	Key results related to dissatisfaction
Safety of video-based telemedicine compared to in-person triage in emergency ophthalmology during COVID-19 2021 (Li et al., 2021)	Emergency ophthalmology	Video	Survey	568 patients	97% of patients agreed or strongly agreed that they were satisfied with their overall care The most common positive feedback was praise of management or time-efficiency Patients with disabilities or comorbidities commented that telemedicine saved burden associated with travel	55% of patients preferred using video consultations in future if needed	Patients reported poor internet connectivity and suboptimal video quality during the teleconsultation Some elderly patients required help to use the video consultations platform
A reflection on an adopted approach from face-to-face to telephone consultations in our Urology Outpatient Department during COVID-19 pandemic 2020 (Patel and Douglas-Moore, 2020)	Urology	Telephone	Survey	62 patients 5 Clinicians	93% of patients were satisfied with their consultation, rating an average satisfaction score of 4.7/5 82% of clinicians were satisfied with the adequacy of the telephone consultation for making a clinical decision. Patients comments for preferring telemedicine included: convenience, avoiding exposure to infection, eliminating cost and time loss associated with travel to the hospital	83% of patients were happy to have telephone consultation in future	Patients reported hearing and cognitive impairment requiring next of kin support Patients reported preference of face-to-face consultation when communicating bad news or sensitive information
Are telephone consultations the future of the NHS? The outcomes and experiences of an NHS urological service in moving to telemedicine 2021 (Efthymiadis et al., 2021)	Urology	Telephone	Survey	119 patients	66-94% of patients were graded as excellent on telehealth satisfaction scale (TeSS) (Q1-7) 77-98% of patients responded 'Agree' on (Q8-12), indicating high satisfaction 87% of patients reported having their appointment on time (Q8). 98% of patients reported that the telephone consultation saved them time from travelling to the hospital (Q9)	77% of patients reported that they would like to use telephone consultations in future	In a small number of patients, the explanation of the diagnosis as well as the thoroughness and carefulness of the clinician were rated as 'poor'
Patient Satisfaction with Tele-and Video-Consultation in the COVID-19 Era e A Survey of Vascular Surgical Patients 2022 (Contractor et al., 2022)	Vascular surgery	Telephone / video	Survey through interviews	68 patients	97% of patients were satisfied with the teleconsultation service 90% of patients felt telemedicine had improved access to vascular team 91% of patients felt that virtual clinics provided well for their current needs 100% of patients were happy with using the home or video consultation software independently >90% of patients were satisfied with the teleconsultation service, felt it was as helpful, and provided as much privacy as a face-to-face consultation 90% of patients felt not needing to travel for appointments was advantageous to them	74% of patients reported that they would prefer to continue with virtual clinics in future	

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Table 2. (Continued).

Title of the study and year of publication	Medical speciality	Telemedicine format	Study design	Users examined and their number	Key results related to satisfaction	Willingness to use telemedicine in future	Key results related to dissatisfaction
Oral and maxillofacial surgery patient satisfaction with telephone consultations during the COVID-19 pandemic (Horgan et al., 2021)	Oral and maxillofacial surgery	Telephone	Survey using Generic Medical Interview Satisfaction Scale (G-MISS)	109 patients	High total satisfaction score of 82.12 on G-MISS 83.48% of patients found telephone consultation to be convenient 94.49% of patients understood the information given just as easily	83.48% of patients would be willing to use telemedicine in future	Trauma patients felt least relieved after the consultation 19.26% feeling less reassured in comparison with a normal consultation. 18 patients who were not willing to use teleconsultations in future were all over the age of 33years
Hello, can you hear me? Orthopaedic clinic telephone consultations in the COVID-19 era- a patient and clinician perspective (Vusirikala et al., 2021)	Orthopaedic	Telephone	Survey	100 patients 25 orthopaedic surgeons	93% of patients were satisfied with telephone consultation 91% of patients were satisfied with the explanation of their condition and answers received to all their questions during the teleconsultation 72% of clinicians reported overall satisfaction with the use of telephone consultations 80% of clinicians found telemedicine took the same amount of time or shorter than face-to-face consultations 84% of clinicians felt telephone consultations required the same or less amount of preparation compared to face-to-face consultations 60% of clinicians found it the same or easy to explain the diagnosis and management over the telephone 76% of clinicians were satisfied with opportunity for patient questions	79% of patients were willing to utilise telemedicine in future 80% of clinicians agreed that telephone consultations should be used in future	Patients reported lack of visual feedback, inability to review images and non-adherence to appointment times.
Patient and clinician satisfaction with video consultation during the COVID-19 pandemic: an opportunity for a new way of working (Byrne and Watkinson, 2021)	Orthopaedics	Video	Survey	59 patient and 62 clinicians	97% of patients rated their appointments as satisfactory (7–10 of 10) 76% of patients saying a remote consultation was more convenient than face-to-face 93% of patients found the instructions provided to access the consultation easy to follow 70% of clinicians reported good connection throughout the consultation 87% of clinicians were able to get all the necessary information from the patient	66% of participants said that they would prefer telemedicine in future	30% of clinicians reported that the occurrence of connection issues, therefore having to reconnect A comment from clinician 'image quality could have been better'

(Continued)

Table 2. (Continued).

Title of the study and year of publication	Medical speciality	Telemedicine format	Study design	Users examined and their number	Key results related to satisfaction	Willingness to use telemedicine in future	Key results related to dissatisfaction
Patients' perspectives of telemedicine appointments for psoriatic arthritis during COVID-19 pandemic: results of a patient-driven pilot survey 2022 (Jethwa et al., 2022)	Psoriatic arthritis	Telephone and video	Survey	128 patients	63% of patients found their telemedicine appointment either as equally or more effective than in-person consultations Patients with well-controlled symptoms were more satisfied with remote reviews compared with those with active disease Patients recognised the benefits of telemedicine including saving time and costs of travel	48% of patients felt that telemedicine would be of benefit to them in the future	Patients reported lack of visual cues, lack of physical examination and effect of rapport especially in new patients Patients reported losing the ease of open communication

review, have evaluated specific service/speciality. These services included surgical specialities (general surgery, oculoplastic and adnexal surgery, oral and maxillofacial surgery and vascular surgery, urology, and orthopaedics). Two studies targeted ophthalmology, with Li et al. focusing on emergency ophthalmology services [36]. Three studies analysed satisfaction with medical abortion services [18,19,32]. Two studies examined rheumatology [23,28] and one study focused on allergy [27]. Audiology was the main medical field in one study [17] and another study evaluated the acceptance of cognitive behavioural therapy for tinnitus [29]. One study examined speech and language therapy [31]. Lastly, two studies focused on oncology services [20,21].

3.2. Satisfaction among recipients of healthcare

Most studies that were included in this review, have evaluated the satisfaction of the recipient of telemedicine ($n = 24$), where 17 of them evaluated recipients of healthcare only. In the two studies that focused on paediatric patients, the information on satisfaction was provided by parents, family or caregivers of these children. Results have demonstrated extremely high satisfaction of $\geq 98\%$ by Darr et al. [30], and 96% by Makhecha et al. [22]. The later study showed that a range of 67%–100% of families were satisfied with the convenience of the provision of medications for children directly to patient address [22]. Another high rate of satisfactions was reported by Kaur et al. where 97% of patients were satisfied with the quality of telemedicine services in the management of hyperthyroidism [25]. Similar high satisfaction with the use of telemedicine was reported by vascular surgery teleconsultation services [39] as well as the use of emergency ophthalmology [36]. Furthermore, both studies on orthopaedics scored high satisfaction (93–97%) [41,42]. Additionally, allergy and virtual voice speech therapy received high satisfaction [27,31]. All abortion telemedicine services were perceived as highly satisfactory by patients with rates ranging between 84.2% and 96.9% [18,19,32]. On oncology teleclinics, Grant et al. reported that 100% of patients were willing to receive blood tests via teleclinics and most patients were satisfied with the format of telemedicine, time allotted to session, ability to ask questions and supportiveness from clinicians (scored 10 on a scale of 0–10) [21]. Convenience with the use of telemedicine, was highly valued among patients in different specialties [20,37,39,40,42,43]. Convenience was rated high in all studies that evaluated telemedicine use in abortion services [18,19,32]. Convenience still rated high (60% of patients) in a study evaluating rheumatology telemedicine, despite overall negative rating of telemedicine in

this speciality [23]. In 65 patients surveyed by Kaur et al. 100% of patients agreed that telephone follow-up consultation had provided a timely service [25]. Generally, follow-up scored better satisfaction when compared to the first consultation where 77.3% of patients who were on follow-up clinic were satisfied with telemedicine as compared to only 46.9% of patients who used telemedicine in the first consultation [26].

3.3. Clinicians' satisfaction

Clinicians included in the current review included doctors, nurses, audiologists, and midwives. Satisfaction of clinicians was the main outcome assessed in 3 studies [17,24,34], while it was examined conjoined with the satisfaction of patients in 6 studies [20,21,23,33,37,41]. Findings show that 92% of public and 75% of private healthcare professionals reported in audiology services, felt comfortable conducting remote consultations [17]. 90% clinicians surveyed at tele-surgical clinics were satisfied with sound and video quality [33]. Nonetheless, connection frequently dropped during the consultation and orthopaedic clinicians reported the need to reconnect in 30% of clinics [42]. Despite this connection failure, 87% of clinicians reported that they were able to get all the necessary information from the patient [42]. Among 45 clinicians surveyed by Kang et al. 64.5% were satisfied with establishing patient rapport as well as with the appropriateness of exchange of information [34]. Clinicians running orthopaedics clinics, reported teleclinics took the same amount of time or shorter than face-to-face consultations [41]. Furthermore, the same study reported that 76% of clinicians were satisfied with opportunity for patient to ask questions [41]. Similarly, in oncology teleclinics, 73.3% of clinicians agreed that, in the majority of cases, telemedicine provided a similar experience as compared to face-to-face clinics [21]. Elawady et al. surveyed clinicians from different specialities and reported that > 60% of clinicians were satisfied with the level of care provided to patients, and that 58% of clinicians thought patients were satisfied with the care provided via telephone consultation [24].

Clinicians reported different challenges to using telemedicine. Elawady et al. reported that clinicians engaged in telemedicine with no prior training (95% of clinicians) [24]. Furthermore, 64% of clinicians were unaware of updated General Medical Council guidelines for remote consultation [24]. Watson et al. reported administrative issues in booking and arranging teleclinics as well as communication with the team [44]. Moreover, 37% of clinicians reported that they were unable to access patient records [24]. On the same research, further concerns about lack of privacy were reported by clinicians [24]. Comparing

the technology used in the assessed telemedicine, phone calls were praised for easiness. However, clinicians were concerned on the lack of visual assessment of patients [41]. Nonetheless, Dhahri et al. reported that 25% of clinicians believed that patient experience of a video consultation was worse than a face-to-face appointment [33].

3.4. Willingness to use telemedicine in future

There were 17 studies who explored the willingness of patients, families, and caregivers to use telemedicine in future consultations, while 4 studies examined the willingness of clinicians to use telemedicine beyond the pandemic. The percentage of patients/families/caregivers who agreed to have telemedicine service in future varied in different studies and specialities. Nonetheless, a general favourability to utilise telemedicine over face-to-face consultations could be observed throughout the studies (60–83% of patients). An exceptionally high rate (93% of patients) of willingness to use telemedicine consultations in the future was reported by Dhahri et al. on surgical teleclinics [33]. Similarly, 90.6% of patients using oncology clinics stated that they will be willing to utilise telemedicine beyond the pandemic [21]. Furthermore, 90% of parents, and caregivers of paediatric patients reported their willingness to use video consultation in future [30]. Nonetheless, lower rates of similar willingness were reported by Jethwa et al. where only 48% of patients receiving psoriatic arthritis care, agreed to use teleconsultation in future [43].

Evaluating the clinician prospective on utilising telemedicine in future, Kang et al. reported 70.4% of oculoplastic and adnexal surgery clinicians were willing to continue using telemedicine in future [34]. In orthopaedics, 80% of clinicians agreed that telephone consultations should be used in future [41]. Furthermore, Grant et al. reported that 100% of clinicians agreed telemedicine should have a place in routine oncology care [21].

3.5. Findings related to dissatisfaction

Despite high satisfaction rate with telemedicine reported by Watters et al. among patients surveyed on speech and language therapy, results showed that 84% believed that they would still benefit from face-to-face review [31]. In rheumatology services, 89% of patients would prefer to have the option of deciding between a face-to-face or telephone consultation [28]. Inability to ask questions during telemedicine use was reported by 17% of gastroenterology and hepatology patients surveyed by Rahman et al. [26]. On the other hand, Thomas et al. reported that patients experienced low audio quality and impersonal care during telemedicine

consultations [27]. In rheumatology clinics, Sloan et al. reported that telemedicine was perceived to have increased misdiagnoses and barriers to accessing care and increased inequalities for vulnerable patients [23]. According to clinicians, barriers to telemedicine in audiology include; poor technology skills, lack of knowledge about telemedicine protocol in audiology and concerns about patients' confidentiality [17]. In abortion teleclinics, Meurice et al. reported 8.4% of patients were unsatisfied with pain control [32]. Both Jethwa et al. and Kang et al. reported physicians' concerns about the establishment of rapport while using telemedicine [34,43]. In orthopaedic teleclinics, patients reported lack of visual feedback and inability to review images [41]. Furthermore, in a small number of urology patients, the explanation of the diagnosis as well as the thoroughness and carefulness of the clinician were rated as 'poor' [38]. In abortion services, 13%–16% of women have preferred in person care [18,19]. Most important reasons for preferring in person care with abortion services were ineffective pain control [32], as well as unsatisfactory level of information provided through telemedicine [19]. In oncology department, patients were not keen on receiving sensitive or bad news by telemedicine [20]. A similar concern was reported by Patel et al. in urology teleclinics [37]. Patients who declined telemedicine tended to be older and/or having very severe condition [28,29]. A correlation between age and preference of consultation type was observed by [35], with 62.5% of patients aged >65 years requesting regular face-to-face reviews compared to only 18.8% of those who were 25–64-year-olds. Furthermore, Grant et al. reported that older patients struggle with telephone-based teleclinics [21].

4. Discussion

Telemedicine has the potential to provide a holistic approach to patient management that extend the services beyond the proximity barrier. The wealth of accessible and easy to understand health information allows patients to comprehend their health issues and explore various solutions to their health concerns. Subsequently, reducing the time and effort needed for patient care from professionals and increases the clarity of the health issue among recipient of care. Furthermore, telemedicine applications found their way to enable flexible booking systems which helps patients decide best-fit time for their appointments and thus reduce time waste. The provision of medical practice remotely in the UK, was expanding slowly since early 2000's. Because of different advantages, telemedicine perceived as more convenient to use by both healthcare utilisers as well as healthcare providers. Despite the perceived benefits of telemedicine,

the major diversion from traditional medical interaction to virtual consultations in the UK, was triggered by COVID-19 pandemic. This transformation was mandatory during the pandemic. Now, in the post-pandemic era, an assessment of the satisfaction with telemedicine is imperative to remodel the healthcare pathway and to aid the integration of broader applications for telemedicine.

Data presented in the current systematic review revealed a considerable quantity of scientific output on telemedicine in many medical specialities. The wide range of reports from healthcare specialties denote response of these specialties to utilise this technology and interest in understanding the quality of the service. However, most studies were reporting on public services (NHS), signifying the scarcity of such research from the private healthcare sector making it difficult to determine if telemedicine had been utilised during the pandemic in these important healthcare settings.

Satisfaction is a highly subjective parameter and using different tools to measure it would add to the potential errors in this measurement. However, despite the application of a variety of measurement tool for satisfaction, studies consistently reported a high overall satisfaction among patients, families, and caregivers. Furthermore, most clinicians who utilised this technology in the provision of patient care reported high satisfaction. The results of the current review come in accordance with other systematic reviews [45]. In a review by Pogorzelska and Chlabicz, which analysed 51 global studies, a high patient satisfaction was reported despite measuring it with different tools in these studies [46]. The level of established technology and organisation of telemedicine have a significant impact on the quality of the service and subsequently the satisfaction of users. A systematic review by Kaur et al. reported that the highest satisfaction is among studies conducted in developed countries such as the United States (82.7%–94.9%) and UAE (81%) [47].

Ease and convenience of telemedicine were appreciated by most patients, families, and caregivers. Families who opted for teleconsultations for their children, appreciated the convenience of receiving medication at their address [22]. Furthermore, patients with long-standing illness valued the ease and convenience of telemedicine. For instance, oncology patients preferred to receive blood test results via telemedicine [20,21]. Convenience still rated high in rheumatology despite an overall negative rating of telemedicine in this speciality [23]. Higher levels of convenience of telemedicine, were reported in various parts of the world. In a neurosurgical center in Texas, 92% of patients agreed or strongly agreed that their telemedicine clinics were satisfactory and 88% agreed that telemedicine was more convenient [48]. Aashima

et al. have reviewed publications from 146 healthcare providers in 12 countries and concluded that telemedicine was satisfactory in addressing patients' concerns, supporting communication with healthcare providers, usefulness, and reliability [49]. Similar high convenience with the use of telemedicine was reported in specialties that were not traditionally served by virtual clinics, such as psychiatry [50], multiple sclerosis [51], and physical, occupational and speech therapy [52]. A similar report from Italy showed that using tele-nursing to monitor the use of insulin micro-infuser in diabetic patients during the pandemic was decisive and was recommended to be integrated it in the ordinary care beyond the pandemic [53]. Furthermore, a systematic review by Sekhon et al. that evaluated the use of telemedicine in elderly with dementia, reported high convenience especially in rural areas [54].

Nonetheless, the findings of the current review highlighted multiple challenges to the use of telemedicine in certain specialties. Patients preferred to be offered the choice to select between face-to-face or telemedicine [28]. Many patients preferred in person care [55–57]. Concerns about the quality of the patient and provider interactions and connections were frequently raised especially with the case of vulnerable cases [10,58,59].

However, research into the reasons of why some patients prefer face-to-face clinics and how to improve patient's uptake of telemedicine is limited. Legal, regulatory, and ethical aspects in using telemedicine were not universal or standard. Potentially, this could lead to increasing malpractice and negligence as well as vulnerability among patients [60]. A review by Nittari et al. highlighted ambiguity in the process of informed consent [60]. Furthermore, protection of data and confidentiality lacked explicit approach [60]. Omboni et al. analysed the worldwide impact of telemedicine during COVID-19 pandemic and outlined that policies, integration and training need to be addressed before universal use of telemedicine [61].

A systematic review by Alsabeeha et al. highlighted barriers influencing satisfaction, including technical issues such as lack of hardware or internet access as well as inability to navigate digital platforms [55,62–64].

Navigating digital platforms was particularly challenging for older patients. Frydman et al. evaluated the predictors of telemedicine use among older adults in the US and identified living in nonmetropolitan area, less years of education, living with no partner and no pre-pandemic telemedicine use as potential deterrent to engaging in telemedicine [65]. The importance social inequalities as major predictors for telemedicine refusal was outlined [66,67]. However, further research to explore the effects of social inequalities is key to improving the quality and access to healthcare via telemedicine. According to Roberts

et al. and Iyer et al. older patients repetitively faced delays in connection, and older patients who have hearing impairment faced difficulties in audio consultations [68,69]. Addressing the needs of older patients could include educating and assessing them to improve technology efficiency. Triana et al. suggested the use of volunteers to aid patients to remotely set up telecommunication device and troubleshoot when required [70]. Nonetheless, technical issues affected all ages of both patients and clinicians [17,27,41]. The impact of technical issues was evident globally [71–74]. Therefore, strengthening the technical infrastructure helps improving the overall experience with telemedicine.

Many women using abortion services, preferred telemedicine to avoid stigma perceived from contact with the service providers. The findings of this review showed that telemedicine use in abortion was perceived as acceptable and preferable over a conventional service [18,19]. Negative experiences with abortion providers and fear of stigma were reported in many places in the world [75–78]. A mixed-method study from Germany that explored the reasons for preferring telemedicine for abortion showed that 48% of respondent valued secrecy and privacy offered by telemedicine [79]. The provision of monopolised tele abortion services would improve access and privacy. Nonetheless, a percentage of women preferred to have in person care for various reasons, such as ineffective pain control, unsatisfactory information, or doubts about the safety of the process [18,19,32].

In the current review, clinicians' satisfaction scored high rates [17,24,33,34,41]. Hoff and Lee, in a systematic review which included 37 studies, reported that physician's satisfaction was high across different specialties, geographic locations, practice locations and care situations [80]. Furthermore, clinicians' satisfaction reported to differ between different healthcare teams. A study by Meese et al. showed that physicians demonstrated higher satisfaction with quality of care and safety provided by telemedicine, while nurses were less satisfied [81]. This might reflect different roles in patients care between physicians and nurses.

4.1. Recommendations

Healthcare is a competitive marketplace, influenced by user satisfaction. Understanding views and experience with telemedicine could help improving the quality of this service. Setting up screening tools to help identify patients who might not be suitable to receive telemedicine, such as patients who expect stressful information and lab results. Patients who wish to have in person consultations should be offered one as they might have some concerns they want to share with the clinician.

Solutions to support patients who experience technical difficulties should be integrated within the service. With the plethora of applications used by different healthcare providers, unifying and simplifying the interface used by patients is essential to help them easily navigate through their asynchronous and synchronous healthcare browsers. Optimising telemedicine could be achieved by using consultation framework and individualised care plan to meet patient's needs. From the clinician's perspective, creating and disseminating practical guidelines for the application of telemedicine in different contexts could improve clinicians' confidence in the service. Providing continuous training on new technology such as an easy-to-follow online courses, troubleshooting and manuals can help improve clinicians' technical skills. Further studies into telemedicine difficulties could help promote best practices.

4.2. Strengths and limitations

The inclusion of large number of studies gave the current review the opportunity to explore the application of telemedicine across a wide spectrum in the UK. However, there is a shortage of research exploring telemedicine in many medical specialities. Therefore, the study has limited pertinence to many medical specialities which were not researched. Furthermore, most studies did not apply comparison of telemedicine with traditional standard of care models. Another important limitation is that the measurement of satisfaction was not consistent across the studies because of various tools used. The actual clinical outcome from telemedicine was not measured as most studies outsourced user views immediately after the telemedicine interaction. Therefore, long term studies that connect the service with the outcome to measure the accuracy of telemedicine are required.

5. Conclusion

COVID-19 pandemic has transformed healthcare in the UK and promoted a revolution in telemedicine applications. Through synchronous and asynchronous contexts, telemedicine offers a wide range of educational, and healthcare services. Telemedicine managed to provide a continued care throughout the pandemic while maintaining social distance. The current review presented commendable evidence of overall satisfaction with telemedicine and encourages different specialities to engage in applying telemedicine to different settings.

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References

- [1] Craig J, Loane M, Wootton R. Does telemedicine have a role to play in disease management? *Dis Manag Health Outcomes*. 1999;6(3):121–130. doi: [10.2165/00115677-199906030-00001](https://doi.org/10.2165/00115677-199906030-00001)
- [2] Bashshur RL. On the definition and evaluation of telemedicine. *Telemed J*. 1995;1(1):19–30. doi: [10.1089/tmj.1.1995.1.19](https://doi.org/10.1089/tmj.1.1995.1.19)
- [3] Wootton R. The possible use of telemedicine in developing countries. *J Telemed Telecare*. 1997;3(1):23–26. doi: [10.1258/1357633971930157](https://doi.org/10.1258/1357633971930157)
- [4] Field M. Committee on Evaluating Clinical Applications of Telemedicine, Institute of Medicine. *Telemedicine: a guide to assessing telecommunications in health care*. Institute of Medicine. Institute of Medicine, National Academy Press; 1996.
- [5] File AR. Health resources and services administration. Rockville, MD: Bureau of Health Professions; 2006.
- [6] Akintunde TY, Akintunde OD, Musa TH, et al. Expanding telemedicine to reduce the burden on the healthcare systems and poverty in Africa for a post-coronavirus disease 2019 (COVID-19) pandemic reformation. *Global Health J*. 2021;5(3):128–134. doi: [10.1016/j.glohj.2021.07.006](https://doi.org/10.1016/j.glohj.2021.07.006)
- [7] World Health Organization. Global strategy on digital health 2020–2025. 2021. <https://www.who.int/doc/default-source/documents/gsdhdaa2a9f352b0445bafbc79ca799cde4d.pdf>
- [8] Battineni G, Pallotta G, Nittari G, et al. Telemedicine framework to mitigate the impact of the COVID-19 pandemic. *J Taibah Univ Med Sci*. 2021;16(2):300–302. doi: [10.1016/j.jtumed.2020.12.010](https://doi.org/10.1016/j.jtumed.2020.12.010)
- [9] Anwar S, Prasad R. Framework for future telemedicine planning and infrastructure using 5G technology. *Wireless Pers Commun*. 2018;100(1):193–208. doi: [10.1007/s11277-018-5622-8](https://doi.org/10.1007/s11277-018-5622-8)
- [10] Talal AH, Sofikitou EM, Jaanimägi U, et al. A framework for patient-centered telemedicine: application and lessons learned from vulnerable populations. *J Biomed Informat*. 2020;112:103622. doi: [10.1016/j.jbi.2020.103622](https://doi.org/10.1016/j.jbi.2020.103622)
- [11] Avison D, Young T. Time to rethink health care and ICT? *Commun ACM*. 2007;50(6):69–74. doi: [10.1145/1247001.1247008](https://doi.org/10.1145/1247001.1247008)
- [12] PATIENTACCESS. 2023. Patient Health Information You Can Trust [Online]. [accessed 15 Nov 2023]. Patient Access Available: <https://www.patientaccess.com/>.
- [13] Ware JE, Snyder MK, Wright WR, et al. Defining and measuring patient satisfaction with medical care. *Eval Program Plann*. 1983;6:247–263. doi: [10.1016/0149-7189\(83\)90005-8](https://doi.org/10.1016/0149-7189(83)90005-8)
- [14] Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Int J Surg*. 2021;88:105906. doi: [10.1016/j.ijsu.2021.105906](https://doi.org/10.1016/j.ijsu.2021.105906)
- [15] Razai MS, Doerholt K, Ladhani S, et al. Coronavirus disease 2019 (covid-19): a guide for UK GPs. *BMJ*. 2020;368:m800. doi: [10.1136/bmj.m800](https://doi.org/10.1136/bmj.m800)
- [16] Lundh A, Gøtzsche PC. Recommendations by Cochrane Review Groups for assessment of the risk of bias in

- studies. *BMC Med Res Methodol.* 2008;8(1):1–9. doi: [10.1186/1471-2288-8-22](#)
- [17] Parmar B, Beukes E, Rajasingam S. The impact of COVID-19 on provision of UK audiology services & on attitudes towards delivery of telehealth services. *Int J Audiol.* 2022;61(3):228–238. doi: [10.1080/14992027.2021.1921292](#)
- [18] Aiken A, Lohr PA, Lord J, et al. Effectiveness, safety and acceptability of no-test medical abortion (termination of pregnancy) provided via telemedicine: a national cohort study. *BJOG: An Int J Obstetrics & Gynaecol.* 2021;128(9):1464–1474. doi: [10.1111/1471-0528.16668](#)
- [19] Erlank CP, Lord J, Church K. Acceptability of no-test medical abortion provided via telemedicine during covid-19: analysis of patient-reported outcomes. *BMJ Sex Reprod Health.* 2021;47(4):261–268. doi: [10.1136/bmj.srh-2020-200954](#)
- [20] Smrke A, Younger E, Wilson R, et al. Telemedicine during the COVID-19 pandemic: impact on care for rare cancers. *JCO Global Oncology.* 2020;6(6):1046–1051. doi: [10.1200/GO.20.00220](#)
- [21] Grant M, Hockings H, Lapuente M, et al. Learning from crisis: a multicentre study of oncology telemedicine clinics introduced during COVID-19. *J Cancer Educ.* 2022;37(6):1861–1869. doi: [10.1007/s13187-021-02053-8](#)
- [22] Makhecha S, Eftychiou L, Tsang V, et al. Patient and family perceptions of the provision of medicines as part of virtual outpatient consultations for children during COVID-19 pandemic. *BMJ Open Qual.* 2022;11(4):e001916. doi: [10.1136/bmj.oq-2022-001916](#)
- [23] Sloan M, Lever E, Harwood R, et al. Telemedicine in rheumatology: a mixed methods study exploring acceptability, preferences and experiences among patients and clinicians. *Rheumatology.* 2022;61(6):2262–2274. doi: [10.1093/rheumatology/keab796](#)
- [24] Elawady A, Khalil A, Assaf O, et al. Telemedicine during COVID-19: a survey of health care professionals' perceptions. *Monaldi Arch Chest Dis.* 2020;90(4). doi: [10.4081/monaldi.2020.1528](#)
- [25] Kaur D, Galloway GK, Oyibo SO. Patient satisfaction with the use of telemedicine in the management of hyperthyroidism. *Cureus.* 2020;12. doi: [10.7759/cureus.9859](#)
- [26] Rahman Z, Ali A, Usman M. Tele-gastroenterology midst COVID-19 pandemic: patients' perspective. *Cureus.* 2021;13. doi: [10.7759/cureus.14708](#)
- [27] Thomas I, Siew LQ, Rutkowski K. Synchronous telemedicine in allergy: lessons learned and transformation of care during the COVID-19 pandemic. *J Allergy Clin Immunol.* 2021;9(1):170–176.e1. doi: [10.1016/j.jaip.2020.10.013](#)
- [28] Jones MT, Arif R, Rai A. Patient experiences with telemedicine in a national health service rheumatology outpatient department during coronavirus disease-19. *J Patient Exp.* 2021;8:23743735211034973. doi: [10.1177/23743735211034973](#)
- [29] Aazh H, Swanepoel DW, Moore BC. Telehealth tinnitus therapy during the COVID-19 outbreak in the UK: uptake and related factors. *Int J Audiol.* 2021;60(5):322–327. doi: [10.1080/14992027.2020.1822553](#)
- [30] Darr A, Senior A, Argyriou K, et al. The impact of the coronavirus (COVID-19) pandemic on elective paediatric otolaryngology outpatient services - an analysis of virtual outpatient clinics in a tertiary referral centre using the modified paediatric otolaryngology telemedicine satisfaction survey (POTSS). *Int J Pediatr Otorhinolaryngol.* 2020;138:110383. doi: [10.1016/j.ijporl.2020.110383](#)
- [31] Watters C, Miller B, Kelly M, et al. Virtual voice clinics in the COVID-19 era: have they been helpful? *Eur Arch Otorhinolaryngol.* 2021;278(10):4113–4118. doi: [10.1007/s00405-021-06643-6](#)
- [32] Meurice M, Whitehouse K, Blaylock R, et al. Client satisfaction and experience of home use of mifepristone and misoprostol for medical abortion up to 10 weeks' gestation at British Pregnancy Advisory Service: a cross-sectional evaluation. *Contraception.* 2021;104:61–66. doi: [10.1016/j.contraception.2021.04.027](#)
- [33] Dhahri AA, Iqbal MR, Pardoe H. Agile application of video telemedicine during the COVID-19 pandemic. *Cureus.* 2020;12. doi: [10.7759/cureus.11320](#)
- [34] Kang S, Raja L, Sim DA, et al. Telemedicine in oculo-plastic and adnexal surgery: clinicians' perspectives in the UK. *Br J Ophthalmol.* 2022;106(10):1344–1349. doi: [10.1136/bjophthalmol-2020-318696](#)
- [35] Golash V, Athwal S, Khandwala M. Teleophthalmology and COVID-19: the patient perspective. *Future Healthc J.* 2021;8(1):e54. doi: [10.7861/fhj.2020-0139](#)
- [36] Li J-PO, Thomas AA, Kilduff CL, et al. Safety of video-based telemedicine compared to in-person triage in emergency ophthalmology during COVID-19. *Eclin Med.* 2021;34:100818. doi: [10.1016/j.eclinm.2021.100818](#)
- [37] Patel S, Douglas-Moore J. A reflection on an adapted approach from face-to-face to telephone consultations in our urology outpatient department during the COVID-19 pandemic – a pathway for change to future practice? *BJU Int.* 2020;126(3):339–341. doi: [10.1111/bju.15119](#)
- [38] Efthymiadis A, Hart EJ, Guy AM, et al. Are telephone consultations the future of the NHS? The outcomes and experiences of an NHS urological service in moving to telemedicine. *Future Healthc J.* 2021;8(1):e15. doi: [10.7861/fhj.2020-0076](#)
- [39] Contractor U, Haas W, Reed P, et al. Patient satisfaction with tele-and video-consultation in the COVID-19 Era–A survey of vascular surgical patients. *Ann Vasc Surg.* 2022;85:105–109. doi: [10.1016/j.avsg.2022.05.009](#)
- [40] Horgan T, Alsabbagh A, Mcgoldrick D, et al. Oral and maxillofacial surgery patient satisfaction with telephone consultations during the COVID-19 pandemic. *Br J Oral Maxillofac Surg.* 2021;59(3):335–340. doi: [10.1016/j.bjoms.2020.08.099](#)
- [41] Vusirikala A, Ensor D, Asokan AK, et al. Hello, can you hear me? Orthopaedic clinic telephone consultations in the COVID-19 era-a patient and clinician perspective. *World J Orthop.* 2021;12(1):24. doi: [10.5312/wjo.v12.i1.24](#)
- [42] Byrne E, Watkinson S. Patient and clinician satisfaction with video consultations during the COVID-19 pandemic: an opportunity for a new way of working. *J Orthod.* 2021;48(1):64–73. doi: [10.1177/1465312520973677](#)
- [43] Jethwa H, Brooke M, Parkinson A, et al. Patients' perspectives of telemedicine appointments for psoriatic arthritis during the COVID-19 pandemic: results of a patient-driven pilot survey. *Bmc Rheumatology.* 2022;6(1):1–6. doi: [10.1186/s41927-021-00242-y](#)
- [44] Watson N, Kurudzhu H, Green A, et al. Application of telehealth for comprehensive Creutzfeldt-Jakob disease surveillance in the United Kingdom. *J Neurol Sci.* 2021;420:117221. doi: [10.1016/j.jns.2020.117221](#)
- [45] Alsabeeha NH, Atieh MA, Balakrishnan MS. Older adults' satisfaction with telemedicine during the

- COVID-19 pandemic: a systematic review. *Telemed E-Health*. 2023;29(1):38–49. doi: [10.1089/tmj.2022.0045](https://doi.org/10.1089/tmj.2022.0045)
- [46] Pogorzelska K, Chlabicz S. Patient satisfaction with telemedicine during the COVID-19 pandemic—a systematic review. *Int J Environ Res Public Health*. 2022;19(10):6113. doi: [10.3390/ijerph19106113](https://doi.org/10.3390/ijerph19106113)
- [47] Kaur KN, Niazi F, Thakur R, et al. Patient satisfaction for telemedicine health services in the era of COVID-19 pandemic: a systematic review. *Front Public Health*. 2022;10:1031867. doi: [10.3389/fpubh.2022.1031867](https://doi.org/10.3389/fpubh.2022.1031867)
- [48] Mohanty A, Srinivasan VM, Burkhardt J-K, et al. Ambulatory neurosurgery in the COVID-19 era: patient and provider satisfaction with telemedicine. *Neurosurg Focus*. 2020;49(6):E13. doi: [10.3171/2020.9.FOCUS20596](https://doi.org/10.3171/2020.9.FOCUS20596)
- [49] Aashima NM, Sharma R. A review of patient satisfaction and experience with telemedicine: a virtual solution during and beyond COVID-19 pandemic. *Telemed E-Health*. 2021;27(12):1325–1331. doi: [10.1089/tmj.2020.0570](https://doi.org/10.1089/tmj.2020.0570)
- [50] Haxhihamza K, Arsova S, Bajraktarov S, et al. Patient satisfaction with use of telemedicine in university clinic of psychiatry: Skopje, North Macedonia during COVID-19 pandemic. *Telemed E-Health*. 2021;27(4):464–467. doi: [10.1089/tmj.2020.0256](https://doi.org/10.1089/tmj.2020.0256)
- [51] D'Haeseleer M, Eelen P, Sadeghi N, et al. Feasibility of real time internet-based teleconsultation in patients with multiple sclerosis: interventional pilot study. *J Med Internet Res*. 2020;22(8):e18178. doi: [10.2196/18178](https://doi.org/10.2196/18178)
- [52] Tenforde AS, Borgstrom H, Polich G, et al. Outpatient physical, occupational, and speech therapy synchronous telemedicine: a survey study of patient satisfaction with virtual visits during the COVID-19 pandemic. *Am J Phys Med Rehabil*. 2020;99(11):977–981. doi: [10.1097/PHM.0000000000001571](https://doi.org/10.1097/PHM.0000000000001571)
- [53] Petrelli F, Cangelosi G, Scuri S, et al. Diabetes and technology: a pilot study on the management of patients with insulin pumps during the COVID-19 pandemic. *Diabetes Res Clin Pract*. 2020;169:108481. doi: [10.1016/j.diabres.2020.108481](https://doi.org/10.1016/j.diabres.2020.108481)
- [54] Sekhon H, Sekhon K, Launay C, et al. Telemedicine and the rural dementia population: A systematic review. *Maturitas*. 2021;143:105–114. doi: [10.1016/j.maturitas.2020.09.001](https://doi.org/10.1016/j.maturitas.2020.09.001)
- [55] Chen PV, Helm A, Fletcher T, et al. Seeing the value of video: a qualitative study on patient preference for using video in a veteran affairs telemental health program evaluation. *Telemed Rep*. 2021;2(1):156–162. doi: [10.1089/tmr.2021.0005](https://doi.org/10.1089/tmr.2021.0005)
- [56] Grossman D, Grindlay K, Buchacker T, et al. Effectiveness and acceptability of medical abortion provided through telemedicine. *Obstet & Gynecol*. 2011;118(2):296–303. doi: [10.1097/AOG.0b013e318224d110](https://doi.org/10.1097/AOG.0b013e318224d110)
- [57] Joughin A, Ibitoye S, Crees A, et al. Developing a virtual geriatric perioperative medicine clinic: a mixed methods healthcare improvement study. *Age Ageing*. 2021;50(4):1391–1396. doi: [10.1093/ageing/afab066](https://doi.org/10.1093/ageing/afab066)
- [58] Gomez T, Anaya YB, SHIH KJ, et al. A qualitative study of primary care physicians' experiences with telemedicine during COVID-19. *J Am Board Fam Med*. 2021;34(Supplement):S61–S70. doi: [10.3122/jabfm.2021.S1.200517](https://doi.org/10.3122/jabfm.2021.S1.200517)
- [59] Nouri S, Khoong EC, Lyles CR, et al. Addressing equity in telemedicine for chronic disease management during the Covid-19 pandemic. *NEJM Catalyst Innov Care Deliv*. 2020;1. doi: [10.1056/CAT.19.1111](https://doi.org/10.1056/CAT.19.1111)
- [60] Nittari G, Khuman R, Baldoni S, et al. Telemedicine practice: review of the current ethical and legal challenges. *Telemed E-Health*. 2020;26(12):1427–1437. doi: [10.1089/tmj.2019.0158](https://doi.org/10.1089/tmj.2019.0158)
- [61] Omboni S, Padwal RS, Alessa T, et al. The worldwide impact of telemedicine during COVID-19: current evidence and recommendations for the future. *Connected Health*. 2022;1:7. doi: [10.20517/ch.2021.03](https://doi.org/10.20517/ch.2021.03)
- [62] Bhuva S, Lankford C, Patel N, et al. Implementation and patient satisfaction of telemedicine in spine physical medicine and rehabilitation patients during the COVID-19 shutdown. *Am J Phys Med Rehabil*. 2020;99(12):1079–1085. doi: [10.1097/PHM.0000000000001600](https://doi.org/10.1097/PHM.0000000000001600)
- [63] Darcourt JG, Aparicio K, Dorsey PM, et al. Analysis of the implementation of telehealth visits for care of patients with cancer in Houston during the COVID-19 pandemic. *JCO Oncol Pract*. 2021;17(1):e36–e43. doi: [10.1200/OP.20.00572](https://doi.org/10.1200/OP.20.00572)
- [64] Pinar U, Anract J, Perrot O, et al. Preliminary assessment of patient and physician satisfaction with the use of teleconsultation in urology during the COVID-19 pandemic. *World J Urol*. 2021;39(6):1991–1996. doi: [10.1007/s00345-020-03432-4](https://doi.org/10.1007/s00345-020-03432-4)
- [65] Frydman JL, Li W, Gelfman LP, et al. Telemedicine uptake among older adults during the COVID-19 pandemic. *Ann Intern Med*. 2022;175(1):145–148. doi: [10.7326/M21-2972](https://doi.org/10.7326/M21-2972)
- [66] Huxhold O, Hees E, Webster NJ. Towards bridging the grey digital divide: changes in internet access and its predictors from 2002 to 2014 in Germany. *Eur J Ageing*. 2020;17(3):271–280. doi: [10.1007/s10433-020-00552-z](https://doi.org/10.1007/s10433-020-00552-z)
- [67] Luo J, Tong L, Crotty BH, et al. Telemedicine adoption during the COVID-19 pandemic: gaps and inequalities. *Appl Clin Inform*. 2021;12(04):836–844. doi: [10.1055/s-0041-1733848](https://doi.org/10.1055/s-0041-1733848)
- [68] Iyer S, Bovonratwet P, Samartzis D, et al. Appropriate telemedicine utilization in spine surgery: Results from a delphi study. *Spine*. 2022;47(8):583–590. doi: [10.1097/BRS.0000000000004339](https://doi.org/10.1097/BRS.0000000000004339)
- [69] Roberts AJ, Malik F, Pihoker C, et al. Adapting to telemedicine in the COVID-19 era: feasibility of dried blood spot testing for hemoglobin A1c. *Diabetes Metab Syndr*. 2021;15(1):433–437. doi: [10.1016/j.dsx.2021.02.010](https://doi.org/10.1016/j.dsx.2021.02.010)
- [70] Triana AJ, Gusdorf RE, Shah KP, et al. Technology literacy as a barrier to telehealth during COVID-19. *Telemed E-Health*. 2020;26(9):1118–1119. doi: [10.1089/tmj.2020.0155](https://doi.org/10.1089/tmj.2020.0155)
- [71] Humphreys J, Schoenherr L, Elia G, et al. Rapid implementation of inpatient telepalliative medicine consultations during COVID-19 pandemic. *J Pain Symp Manage*. 2020;60(1):e54–e59. doi: [10.1016/j.jpainsymman.2020.04.001](https://doi.org/10.1016/j.jpainsymman.2020.04.001)
- [72] Leite H, Hodgkinson IR, Gruber T. New development: 'Healing at a distance'—telemedicine and COVID-19. *Public Money Manag*. 2020;40(6):483–485. doi: [10.1080/09540962.2020.1748855](https://doi.org/10.1080/09540962.2020.1748855)
- [73] Rao SS, Loeb AE, Amin RM, et al. Establishing telemedicine in an academic total joint arthroplasty practice: needs and opportunities highlighted by the COVID-19 pandemic. *Arthroplast Today*. 2020;6(3):617–622. doi: [10.1016/j.artd.2020.04.014](https://doi.org/10.1016/j.artd.2020.04.014)
- [74] Wosik J, Fudim M, Cameron B, et al. Telehealth transformation: COVID-19 and the rise of virtual care. *J Am Med Inf Assoc*. 2020;27(6):957–962. doi: [10.1093/jamia/ocaa067](https://doi.org/10.1093/jamia/ocaa067)
- [75] Aiken AR, Romanova EP, Morber JR, et al. Safety and effectiveness of self-managed medication abortion

- provided using online telemedicine in the United States: a population based study. *Lancet Regional Health–Am.* 2022;10:10. doi: [10.1016/j.lana.2022.100200](https://doi.org/10.1016/j.lana.2022.100200)
- [76] Biggs MA, Brown K, Foster DG, et al. Perceived abortion stigma and psychological well-being over five years after receiving or being denied an abortion. *PLoS One.* 2020;15(1):e0226417. doi: [10.1371/journal.pone.0226417](https://doi.org/10.1371/journal.pone.0226417)
- [77] Endler M, Petro G, Danielsson KG, et al. A telemedicine model for abortion in South Africa: a randomised, controlled, non-inferiority trial. *Lancet.* 2022;400(10353):670–679. doi: [10.1016/S0140-6736\(22\)01474-X](https://doi.org/10.1016/S0140-6736(22)01474-X)
- [78] Sorhaindo AM, Lavelanet AF. Why does abortion stigma matter? A scoping review and hybrid analysis of qualitative evidence illustrating the role of stigma in the quality of abortion care. *Soc Sci Med.* 2022;311:115271. doi: [10.1016/j.socscimed.2022.115271](https://doi.org/10.1016/j.socscimed.2022.115271)
- [79] Killinger K, Günther S, Gomperts R, et al. Why women choose abortion through telemedicine outside the formal health sector in Germany: a mixed-methods study. *BMJ Sex Reprod Health.* 2022;48(e1):e6–e12. doi: [10.1136/bmj.srh-2020-200789](https://doi.org/10.1136/bmj.srh-2020-200789)
- [80] Hoff T, Lee D-R. Physician satisfaction with telehealth: a systematic review and agenda for future research. *Qual Manag Health Care.* 2022;31(3):160–169. doi: [10.1097/QMH.0000000000000359](https://doi.org/10.1097/QMH.0000000000000359)
- [81] Meese KA, Hall AG, Feldman SS, et al. Physician, nurse, and advanced practice provider perspectives on the rapid transition to inpatient and outpatient telemedicine. *Telemed Rep.* 2022;3(1):7–14. doi: [10.1089/tmr.2021.0034](https://doi.org/10.1089/tmr.2021.0034)

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