Supplementary Appendix A The details of the databases search results

PubMed: 343				
Search number	**Query**	**Sort By**	**Filters**	**Results**
1	((("COVID-19"[Title]) OR ("SARS-CoV-2"[Title])) OR ("novel coronavirus"[Title])) AND (eHealth[Title])	Most recent	Full text, humans, English	13
2	((("COVID-19"[Title]) OR ("SARS-CoV-2"[Title])) OR ("novel coronavirus"[Title])) AND (telehealth[Title])	Most recent	Full text, humans, English	120
3	((("COVID-19"[Title]) OR ("SARS-CoV-2"[Title])) OR ("novel coronavirus"[Title])) AND (telemedicine[Title])	Most recent	Full text, humans, English	176
4	((("COVID-19"[Title]) OR ("SARS-CoV-2"[Title])) OR ("novel coronavirus"[Title])) AND ("mobile health"[Title])	Most recent	Full text, humans, English	7
5	((("COVID-19"[Title]) OR ("SARS-CoV-2"[Title])) OR ("novel coronavirus"[Title])) AND (mHealth[Title])	Most recent	Full text, humans, English	1
6	((("COVID-19"[Title]) OR ("SARS-CoV-2"[Title])) OR ("novel coronavirus"[Title])) AND (Telecare[Title])	Most recent	Full text, humans, English	0
7	((("COVID-19"[Title]) OR ("SARS-CoV-2"[Title])) OR ("novel coronavirus"[Title])) AND (teleconsultation[Title])	Most recent	Full text, humans, English	11
8	((("COVID-19"[Title]) OR ("SARS-CoV-2"[Title])) OR ("novel coronavirus"[Title])) AND (telemonitoring[Title])	Most recent	Full text, humans, English	4
9	((("COVID-19"[Title]) OR ("SARS-CoV-2"[Title])) OR ("novel coronavirus"[Title])) AND ("virtual care"[Title])	Most recent	Full text, humans, English	11
10	((("COVID-19"[Title]) OR ("SARS-CoV-2"[Title])) OR ("novel coronavirus"[Title])) AND ("online care"[Title])	Most recent	Full text, humans, English	0
Scopus: 561				
Search number	**Query and filter**		**Results**	
1	(TITLE ("covid-19") OR TITLE ("SARS-CoV-2") OR TITLE ("novel coronavirus") AND TITLE (e-health)) AND (LIMIT-TO (LANGUAGE, "English"))		10 document results	
2	(TITLE ("covid-19") OR TITLE ("SARS-CoV-2") OR TITLE ("novel coronavirus") AND TITLE (telehealth)) AND (LIMIT-TO (LANGUAGE, "English"))		183 document results	
3	(TITLE ("covid-19") OR TITLE ("SARS-CoV-2") OR TITLE ("novel coronavirus") AND TITLE (telemedicine)) AND (LIMIT-TO (LANGUAGE, "English"))		321 document results	
4	(TITLE ("covid-19") OR TITLE ("SARS-CoV-2") OR TITLE ("novel coronavirus") AND TITLE ("mobile health")) AND (LIMIT-TO (LANGUAGE, "English"))		8 document results	
5	(TITLE ("covid-19") OR TITLE ("SARS-CoV-2") OR TITLE ("novel coronavirus") AND TITLE (m-health)) AND (LIMIT-TO (LANGUAGE, "English"))		3 document results	
6	(TITLE ("covid-19") OR TITLE ("SARS-CoV-2") OR TITLE ("novel coronavirus") AND TITLE (telecare)) AND (LIMIT-TO (LANGUAGE, "English"))		0 document results	
7	(TITLE ("covid-19") OR TITLE ("SARS-CoV-2") OR TITLE ("novel coronavirus") AND TITLE (teleconsultation)) AND (LIMIT-TO (LANGUAGE, "English"))		18 document results	
8	(TITLE ("covid-19") OR TITLE ("SARS-CoV-2") OR TITLE ("novel coronavirus") AND TITLE (telemonitoring)) AND (LIMIT-TO (LANGUAGE, "English"))		7 document results	
9	(TITLE ("covid-19") OR TITLE ("SARS-CoV-2") OR TITLE ("novel coronavirus") AND TITLE ("virtual care")) AND (LIMIT-TO (LANGUAGE, "English"))		11 document results	
10	(TITLE ("covid-19") OR TITLE ("SARS-CoV-2") OR TITLE ("novel coronavirus") AND TITLE ("online care")) AND (LIMIT-TO (LANGUAGE, "English"))		0 document results	

Supplementary Appendix A (*Continued*)

PubMed: 343		
Web of Science (WOS): 427		
Search number	**Query and filter**	**Results**
1	(TI = ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND TI = eHealth) AND **LANGUAGE:** (English) Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan = All years	5
2	((TI = ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND TI = telehealth)) AND **LANGUAGE:** (English) Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan = All years	156
3	((TI = ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND TI = telemedicine)) AND **LANGUAGE:** (English) Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan = All years	230
4	((TI = ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND TI = "mobile health")) AND **LANGUAGE:** (English) Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan = All years	5
5	((TI = ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND TI = mHealth)) AND **LANGUAGE:** (English) Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan = All years	2
6	((TI = ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND TI = telecare)) AND **LANGUAGE:** (English) Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan = All years	0
7	((TI = ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND TI = teleconsultation)) AND **LANGUAGE:** (English) Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan = All years	10
8	((TI = ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND TI = telemonitoring)) AND **LANGUAGE:** (English) Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan = All years	5
9	((TI = ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND TI = "virtual care")) AND **LANGUAGE:** (English) Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan = All years	14
10	((TI = ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND TI = "online care")) AND **LANGUAGE:** (English) Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan = All years	0
Science Direct: 204		
Search number	**Query and filter**	**Results**
1	Title: ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND "eHealth"	1
2	Title: ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND "telehealth"	56
3	Title: ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND "telemedicine"	128
4	Title: ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND "mobile health"	4
5	Title: ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND "mHealth"	0
6	Title: ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND telecare	0
7	Title: ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND teleconsultation	11
8	Title: ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND telemonitoring	2
9	Title: ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND "virtual care"	2
10	Title: ("COVID-19" OR "SARS-CoV-2" OR "novel coronavirus") AND "online care"	0

(*Continued*)

Supplementary Appendix A (*Continued*)

PubMed: 343		
Google Scholar: 905		
Search number	**Query and filter**	**Results**
1	allintitle: “COVID-19” OR “SARS-CoV-2” OR “novel coronavirus” “eHealth”	14
2	allintitle: (“COVID-19” OR “SARS-CoV-2” OR “novel coronavirus”) “telehealth”	320
3	allintitle: (“COVID-19” OR “SARS-CoV-2” OR “novel coronavirus”) “telemedicine”	458
4	allintitle: (“COVID-19” OR “SARS-CoV-2” OR “novel coronavirus”) “mobile health”	23
5	allintitle: (“COVID-19” OR “SARS-CoV-2” OR “novel coronavirus”) “mHealth”	7
6	allintitle: (“COVID-19” OR “SARS-CoV-2” OR “novel coronavirus”) “telecare”	2
7	allintitle: (“COVID-19” OR “SARS-CoV-2” OR “novel coronavirus”) “teleconsultation”	21
8	allintitle: (“COVID-19” OR “SARS-CoV-2” OR “novel coronavirus”) “telemonitoring”	9
9	allintitle: (“COVID-19” OR “SARS-CoV-2” OR “novel coronavirus”) “virtual care”	49
10	allintitle: (“COVID-19” OR “SARS-CoV-2” OR “novel coronavirus”) “online care”	2

Supplementary Appendix B Table of information extraction

Study	Location	Study design	Database	Software (link to)	Type of telehealth/ time of development	Modality	Telehealth service type	Field	Opportunities	Challenges
Abuzeineh et al[6]	The United States/ Maryland	Case report	Scholar	EMR	Telemedicine/after	Video	Treatment/follow-up	Transplant	Continuity of care for kidney transplant recipients with COVID-19 or reduce exposure risk for providers and preserve personal protective equipment, patients' good experience and satisfaction	–
Ahsan et al[61]	Pakistan/Islamabad	Cross-sectional study	Scholar	Phone	Telemedicine/after	Mobile phone calls	Consultation	Multidisciplinary	High patients satisfaction	–
Álvarez-Maestro[62]	Spain/Madrid	Observational, prospective, cross-sectional	Science Direct/ Scopus/Scholar	EMR	Telemedicine/after	Phone/audio	Teleconsultation	Urology	High patient satisfaction, willing to continue telemedicine after Covid -19 Pandemic	Needed help from family, experienced worse urological symptom
Ashraf and Aqeel[63]	Pakistan/Lahore	Quantitative descriptive	Scholar	WhatsApp	Telemedicine/after	Telephone/audio	Treatment/follow-up	Cardiology	Successfully CHF patients management at home Prevent hospitalization Keeping patients safe from virus exposure	–
Ashry and Alsawy[64]	Egypt/Cairo	Prospective study	ISI/Scopus, Scholar	Facebook Messenger/phone	Telemedicine/after	Synchronous and asynchronous/audio call	Follow-up	Neurosurgery	High patients and satisfaction, patients were satisfied with the quality of sound and video transmission, time and cost savings, preference of telemedicine visits in the future,	Need to hands-on examination, muscle strength examination
Atreya et al[22]	India/Kolkata	Quantitative descriptive	Scholar	Not applicable	Teleconsultation/ before	telephone	Patient care monitoring	Palliative care	High satisfaction of patients, Patients' Preference of teleconsultation for future care, Willing to pay for teleconsultations in the future Cost reduction	Limited physical examination, health information quality, Confidentiality Access to internet server Access to physicians for out-of-hours support
Badiee et al[65]	The United States (San Francisco, California)	Quantitative	ISI/Scopus/Scholar	Zoom	Telemedicine/after	Real time	Treatment/follow-up	Interdisciplinary	Patient and families high rates of satisfaction, patient's comfortable using the telehealth technology with time and money savings, decongestion of clinics and waiting areas, allowing social distancing, addressing clinic space limits, and increased efficiency by eliminating the need for patient and family movement	Limited physical examination, appropriateness discuss with physicians, negative impact on patient perception of care
Barney et al[60]	The United States (San Francisco, California)	Quantitative descriptive	PubMed/Science Direct/Scopus/ Scholar	ZOOM (a Health Insurance Portability and Accountability Act [HIPAA]-compliant audiovisual tool)	Telemedicine/after	Audiovisual tool	Treatment	Adolescent and young adult medicine	Increase in the telemedicine visits, Increase in the clinic billed relative value units	Privacy and confidentiality, Limited provider comfort with clinical decision-making in the absence of a complete physical examination or laboratory data Interdisciplinary work, Technology literacy gap, Language barriers, Reimbursements
Bhuva et al[66]	The United States/ Texas	Prospective cohort/ quantitative	Scholar	an HIPAA compliant platform (Doxy.me	Telemedicine/after	Audiovisual	Treatment/follow-up	Physical medicine and rehabilitation	Very high patient satisfaction, prefer telemedicine over in-person appointments, time and money saving	Technical problems(video or audio issues/ connectivity issues, musculoskeletal examination, less personal interaction and decreased ability to provide thorough clinical care
Boehm et al[67]	Germany/Mainz	Brief Correspondence	ISI/Science Direct/ PubMed/Scopus/ Scholar	Not applicable	Telemedicine/after	Video	Teleconsultation	Urology	Patients' high eligible and willingness to using telemedicine	Technical difficulties
Bourdon et al[68]	France/Paris	Prospective observational cohort study	ISI/Science Direct/ PubMed/Scopus/ Scholar	Doctolib (the leading booking platform in France)	Mobile health/ telemedicine/after	Video	Consultation/follow-up	Ophthalmology	satisfying health care access, Preserving social distancing sanitary precautions	Examination and complementary exams
Burgos et al[69]	Argentina, Buenos Aires	Retrospective cohort study	Scholar	NA	Telemedicine/after	Synchronized video	Follow-up	Cardiology	Telemedicine ease of use, patients high acceptability, patients high satisfaction,	–
Capozzo et al[41]	Italy/Bari	Quantitative descriptive	PubMed	Tele/cell-phone	Telemedicine/after	Tele cell/phone	Tele consultation	Neurology/center for neurodegenerative Disease and the aging brain	High satisfaction of patients and caregivers, willingness to continue remote evaluation programs. Significant worsening of behavior and language functions Cost reduction	–
Capozzo et al[42]	Italy/Bari			Tele/cell-phone	Telemedicine/2020	Tele cell/phone	Tele consultation			–

(*Continued*)

Supplementary Appendix B (*Continued*)

Study	Location	Study design	Database	Software (link to)	Type of telehealth/ time of development	Modality	Telehealth service type	Field	Opportunities	Challenges
		Quantitative descriptive	Web of Science/ PubMed/Scopus/ Scholar					Neurology/center for neurodegenerative Disease and the aging brain	High satisfaction of patients and caregivers, willingness to continue remote evaluation programs Significant worsening of behavior and language functions Cost reduction	
Carlberg et al[70]	The United States/ Washington DC	Retrospective quantitative	Science Direct/ Scopus/Scholar	Not applicable	Telemedicine/before	Synchronous video	Evaluation/ treatment	Emergency department (ED)	Reduction of emergency department length of stay, reduction in personal protective equipment, provider safety, reduction in repeat health care encounter	–
Casares et al[71]	The United States/ Orlando	quantitative	Science Direct/ Scopus/Scholar	Zoom, FaceTime, phone	Telehealth/after	Audio/synchronous video	Follow-up	Neurology	Willingness to continue use of telemedicine for both patients and providers, time and money saving, comfortable using the technology. High patients and providers satisfaction	Difficulties in hearing, the provider, a lag in audio or visual, or not receiving the email link, poor cell phone connection and lack of video application
Chang et al[72]	The United States/ New York	Letter to the editor	ISI/Scopus/Scholar	Not applicable	Telehealth/after	Video	Follow-up	Kidney transplant	telemedicine is feasible and effective for routine and for-cause visits	Technical issues and inability to check vital signs and blood glucose levels during some of encounters
Chávarri-Guerra et al[73]	Mexico/Mexico city	Qualitative/brief communications	Scholar	Zoom, Google Hangouts video, or WhatsApp	Telemedicine/before	Audiovisual	Treatment/follow-up	Supportive care	Maintain continuity of care, limited the risk of contagion for both patients and providers	Limited experience with the communication method, Internet connectivity, interventions interruptions, lack of physical exam, privacy concerns, lack of device for communication
Colle et al[74]	France/Paris	Quantitative	PubMed/Scopus/ Scholar	Not significant	Telehealth/after	Audiovisual/phone	Consultation	Psychiatry	excellent feasibility of this switch to teleconsultation, high patients and physicians satisfaction, time saving, excellent rates of acceptability from psychiatrists and patient	–
Darcourt et al[75]	The United States/ Houston	Prospective observational study	Scholar	Electronic health record HER; the Houston Methodist MyChart platform)	Telemedicine/after	Video/phone	Treatment/follow-up	Hematology and oncology	high levels of satisfaction with the use of telehealth video visits for patients and providers, willing to use telemedicine in the future, ease of use of the MyChart video visit, patients and physicians wiling to continue telemedicine visits in future	Lack of Internet or mobile device or technical issues with the MyChart application, statistically significant difference between patients who accepted video visits versus those who declined, in terms of younger mean age, higher median annual income, private insurance, and female sex,
Davis et al[76]	The United States/ Charleston	Quantitative descriptive	Web of Science	Teladoc_, the video conferencing platform	Treatment/after	First,Audio/next, audiovisual	Treatment Follow up	Urology	Decrease of productivity, Proper need meet of patients, willingness to continue telemedicine in future	Technical difficulties
Deshmukh et al[77]	India/Telangana	Retrospective	Scholar	Skype, WhatsApp, Facetime, Gaze 9 photo app	Telemedicine and mobile health /after	Synchronous video, asynchronous images, phone	Consultation/Follow up	Ophthalmology	safe patient care delivery	Clinicians must take additional effort
Dobrusin et al[58]	The United States/ Michigan and the Washington, DC,	Quantitative descriptive	PubMed/Science Direct/Scholar	common platforms, such as FaceTime and Zoom,	Telemedicine/ before	Audio/audiovisual	Care	Internal medicine/ community based practices	High satisfaction and acceptance of patients and providers, willingness to continue telehealth in the future	Inability to perform a physical examination
Eberly et al[56]	The United States/ Philadelphia, Pennsylvania	Quantitative descriptive	PubMed/Scholar	Not applicable	Telemedicine/before	Phone/video	Care	Cardiology/hospital	–	Inequity in access to telemedical care for female, non-English speaking, older, and poorer patients
Efe et al[78]	Turkey/Şanlıurfa	Quantitative	ISI/Scopus/Scholar	Telephone, free smart phone applications	Telemedicine/before	Phone, audiovisual	Treatment/follow-up	Hepatology	The telehealth group maintained remission significantly better than the standard care group, patient's wellbeing, and electronically transferred laboratory reports to be easy and effective, better adherence to therapy during the COVID-19 period and had a significantly lower relapse rate, telehealth establishes a good alliance between physicians and patients	Education level and employment status impact on telemedicine use

Supplementary Appendix B (*Continued*)

Study	Location	Study design	Database	Software (link to)	Type of telehealth/ time of development	Modality	Telehealth service type	Field	Opportunities	Challenges
Esper et al[27]	São Paulo, Brazil	Nonrandomized clinical trials, prospective study	Scholar	A telemedicine platform, with HIPAA compliance certified system for data security (name unknown)	Telemedicine/after	Videoconference	Monitor	Preventive care/ hospital	Empirical treatment with hydroxychloroquine associated with azithromycin for suspected cases of COVID-19 to reduce the need for hospitalization. Starting the medication before the seventh day of symptoms lead to less need for hospitalization	Right timing to prescribe medication
Esper et al.[45]	The United States/ Atlanta, Georgia;	Quantitative	Scholar	Zoom, phone	Telemedicine/after	Audiovisual/phone	Treatment/follow-up	Multidisciplinary	Maintaining organization income, maintain continuity of care, access to care, higher claim submission rate, patients satisfaction	Lack of access to technology, and limited internet access, need to redo providers' scheduling templates, the completion of consent forms, which required signatures from the patient and provider, restrictions on prescriptions for scheduled substances
Evin et al[79]	Turkey/Izmir	Quantitative	Scholar	CareLink Personal software, FreeStyle LibreLink, email, phone	Telemedicine/after	Audiovisual, phone/ text	Follow-up	Endocrinology	beneficial to achieve optimum glycemic control in patients with new-onset T1D	–
Exum et al[80]	The United States (Dallas, Texas)	Case study (COVID-19 feature article)	ISI, Scholar	Microsoft Teams application-HIPAA compliant	Telehealth	Virtual care	Care and treatment consultation	COVID-19	Preserve personal protective equipment, mitigated COVID-19–related harm and influenced recovery	Scheduling, coordination of care, and therapist scheduling, provider availability, willingness to participate, time consuming
Fieux et al[3]	Lyon, France	Quantitative descriptive/ prospective	PubMed/Science Direct/Scopus/ Scholar	"SARA" platform	Telemedicine/after	Audiovisual	Teleconsultation	ENT/hospital	High patients and physicians satisfaction Patients' preference of telemedicine for future Time and cost savings System' ease of use Easy to back up Demographical comparability of groups Dependency between sound/video quality and patient satisfaction	Absence of physical examination, Poor sound and video quality Technical (connection) problems
Futterman et al[81]	The United States/ New York	Cross-sectional study	ISI/Scopus/Scholar	Not significant	Telemedicine/after	Not significant	Treatment/follow-up	Obstetrics and gynecology	Appropriate continuation of satisfactory prenatal care with no impact on patient perceived satisfaction of care. Care equity for all ethnicity, language and care subgroups	–
Goodman et al[82]	Spain/Malaga	Quantitative/ nonrandomize clinical trial	Web of Science/ PubMed/Scopus/ Scholar	TV-AssistDem	Telemedicine/before	Television-based and telephone-based	Follow-up	Psychiatry	Improved mental health	Limitation in presenting proper amount of information
Govil et al[83]	The United States/ Atlanta, Georgia	Descriptive/ quantitative	Science Direct/ Scopus/Scholar	Epic Hyperspace and AmWell/phone	Telemedicine/after	Audiovisual/phone	Treatment/follow-up	Otolaryngology	Reduction in visit time, some aspects of the pediatric otolaryngology physical exam such as oral cavity/oropharyngeal exam was noted to be easier to perform during video visits due to improved patient compliance. Patients time saving	Lack of adequate device for telemedicine visit, resolution of original medical concern, and no access to the internet
Grutters et al[84]	The Netherlands/ Nieuwegein	Retrospective/ quantitative	Scholar	Luscii application	Mobile health/after	Text/phone	Monitoring	Pulmonology	Reduction in length of hospitalization, user friendly of home telemonitoring, recommending home telemonitoring to acquaintances	–
Guarino et al[85]	Italy/ Naples	Prospective observational study	PubMed/Scopus/ Scholar	Skype and WhatsApp, e-mail, fax, and phone call	Telemedicine/before	Real-time video, phone/text	Evaluation/ consult/ follow up	Hepatology/ gastroenterology	Patients satisfaction, prohibiting exposure, clinical effectiveness, continuity of care, faster and increased availability of medical care	–
Guest et al[28]	The United States/ Atlanta	Quantitative descriptive/cohort	PubMed/Scholar	an HIPPA-compliant videoconference service (The Pre-Exposure Prophylaxis at Home	Telehealth/after	Video	Test	Laboratory/not applicable	Approved Suitability and sufficiency self-collected samples for testing for COVID-19 laboratory and clinically, High acceptance of home collection of specimen by participants	Not applicable

(*Continued*)

Supplementary Appendix B (*Continued*)

Study	Location	Study design	Database	Software (link to)	Type of telehealth/ time of development	Modality	Telehealth service type	Field	Opportunities	Challenges
				(PrEP@Home) system)						
Hoagland et al[86]	Brazil/Rio de Janeiro	Brief communication	ISI/Science Direct/ PubMed/Scopus/ Scholar	Phone	Telemedicine/after	Telephone	Teleconsultation/ follow-up	Infectious disease	Effective to avoid medicaments shortage, Time saving, high patients' acceptability	Cell phone and internet availability, lack of regulations on telemedicine and HIV self-testing
Joshi et al[87]	The United States/ Philadelphia	Quantitative	PubMed/Scopus/ Scholar	JeffConnect program	Telehealth/before	Real-time video	Screening, evaluation, and testing	Infectious disease	Decrease clinician and patient exposure in a health care setting, maximize efficient use of PPE, and increase safe access to COVID-19–related testing and management in the community setting	–
Kang et al[88]	The United Kingdom/ London	Comment	ISI/PubMed/Scopus/ Scholar	Attend Anywhere platform	Telemedicine/after	Video	Teleconsultation/ follow-up	Ophthalmology	Usefulness of telemedicine for patients care, more accurately triage and consult new referrals, providers satisfaction on the resolution of the video image, better care, high patients confidence	–
Kerber et al[89]	The United States/ Rochester	Correspondence	ISI/PubMed/Scopus/ Scholar	Electronic medical record	Telehealth/before	Video	Evaluation/ consultation	Dermatology	Highlight the use of multidisciplinary virtual care aiding in the diagnosis.	–
Khairat et al[90]	The United States/ Carolina	Cross-sectional cohort study	Scholar	A online portal	Telehealth/before	Telephone or video call	Treatment	Infectious disease	High patients satisfaction, e convenience of remote consultation, convenience of out of hour appointments, d avoiding emergency department visit	Long wait times, lack of interpersonal communication, poor telehealth equipment setup, and lack of clarity around ordering COVID-19 testing
Klain et al[91]	Italy/Naples	Qualitative	ISI/Scopus/Scholar	Phone/fax/e-mail	Telemedicine/after	Phone/text	Consultation/follow-up	Oncology	Continuous care, prohibit patients exposure, the utility of telemedicine tools at the time of Covid-19, allowed active surveillance, cost saving for patients	–
Krenitsky et al[92]	The United States/ New York	Quantitative/ descriptive	PubMed/Science Direct	EMR platform	Telemedicine/after	Telephone/video	Telemonitoring	Obstetrics and gynecology/n academic medical center and its community hospital	continuance of outpatient management in almost telehealth visits Effectiveness in surveillance minimization of patient and provider exposure,	Technological Problems in connect to the telehealth video interface, communication of new workflows and protocols
Lai et al[93]	Hong Kong	Randomized clinical trial	Science Direct/ Scopus/Scholar	Zoom, WhatsApp, and FaceTime/phone	Telehealth/after	Video/phone	Consultation	Rehabilitation	Varying degrees of improvements in physical and mental health, perceived burden and self-efficacy were observed among caregivers in the video-conferencing group, which were absent in the telephone-only group	–
Layfield et al[94]	The United States/ Pennsylvania	Quantitative descriptive	Web of Science/ PubMed/Scopus/ Scholar	First, Apple FaceTime then, BlueJeans and Doximity video dialer (all adhere to HIPAA recommendations)	Telemedicine/after	Video	Preoperative discussions, postoperative visits, and oncologic surveillance	Otorhinolaryngology head and neck surgery, academic head and neck surgery practice	This study systematically explores patient satisfaction with video-based tele-medicine visits during COVID-19 utilizing a validated telemedicine satisfaction survey in patients presenting to an academic head and neck surgery practice This study systematically explores patient satisfaction with video-based telemedicine visits during COVID-19 utilizing a validated telemedicine satisfaction survey in patients presenting to an academic head and neck surgery practice This study systematically explores patient satisfaction with video-based telemedicine visits during COVID-19 utilizing a validated telemedicine satisfaction survey in patients presenting to an academic	Absence of in-depth physical examinations, technical (connectivity) problems,

Supplementary Appendix B (*Continued*)

Study	Location	Study design	Database	Software (link to)	Type of telehealth/ time of development	Modality	Telehealth service type	Field	Opportunities	Challenges
									head and neck surgery practice High patient satisfaction	
Li et al[95]	Tencent, Shenzhen, China	Quantitative/ descriptive	PubMed/Science Direct/Scopus/ Scholar	WeChat	Telemedicine/after	Video	Follow-up	vascular surgeons hospital	High patient satisfaction Prefer telemedicine on coming to hospital, complete agreement on the advantages of telemedicine including no infection risks, no need to travel, no need to wait for long time, and were more personal and cheaper care	Absence of physical contact and imaging assessment
Lim et al[96]	Singapore	Quantitative	ISI/PubMed/Science Direct/Scopus/ Scholar	Phone	Telemedicine/after	Phone	Follow up	Endocrinology	High patients and parents satisfaction, ease to speak, adequate opportunity to ask questions, and being understood over the telehealth session, would continue to use this telehealth care, reduced their anxiety around contracting COVID-19	–
Lin et al[97]	Taiwan (Taipei)	Quantitative (cohort retrospective)	ISI/PubMed/Scopus	U Meeting (CyberLink Corp)-linked with HIS	Telemedicine/during COVID-19	Video interview	Prevention	Hospital/ED[1]	Reduce physicians' time of exposure to patients who pose a risk of COVID-19 transmission (HCP safety) Improving infection control of COVID-19 Alleviate the workload and stress of health care workers Improving quality of images and interpretation of laboratory data for telemedicine group	Increase total evaluation time
Lonergan et al[98]	The United States (California, San Francisco)	Quantitative (descriptive-analytics cross-sectional)	ISI/PubMed/Scopus	HIPAA compliant video conferencing platform (Zoom Video Communications Inc.) not specified	Telehealth/pre-COVID-19	Video visits	Oncological care	Cancer center/ oncology	Access to oncologic care for patients during the pandemic	–
Longo et al[99]	Italy/Naples	Retrospective study	Science Direct/ Scopus/Scholar	The CareLink platform	Telemedicine/after	Text	Follow up	Endocrinology	Most of the metrics of glucose control during the COVID-19 lockdown, continuity of care,	–
Lopez-Villegas et al[100]	Spain/Almeria	Descriptive and retrospective study	Scholar	Not significant	Telemedicine/after	Videoconference	Consultation/ treatment	Emergency medicine	Reduced the possibility of infection, savings in PPE, and disinfection and cleaning cost	The language barrier resulted in the limited comprehension of orders
Lynch et al[101]	The United States/ New York	Qualitative/ retrospective cohort study	ISI, Scopus/Scholar	ZOOM, WebEx	Telehealth/after	Synchronous video	Follow-up	Psychiatry	High telehealth acceptance by patients, unchanged service utilization, unchanged service utilization, continuity of care,	Maintaining attention in the virtual session was a common problem
Madden et al[102]	The United States (New York)	Mixed-method (quantitative and qualitative)	ISI/PubMed/Scopus	MyChart application: integrated with EMR	Telehealth	Televisits	Prenatal care	Hospital/obstetrics	Limits COVID-19 exposure Ensures continued access to care Convenience for patients with increased childcare responsibilities	Compliance/billing issues Rapid implementation precluded small scale testing Discomfort/hesitation/anxiety with telehealth visits and technology Initial set-up technically difficult Technical difficulties with logging on and maintaining continuous Wi-Fi or data connection through visit Need for home monitoring devices (i.e., fetal heart tone Doppler's and blood pressure cuffs) Limited data on the use of telehealth in routine obstetrics Language barriers/translation services more difficult to use during telehealth visits Rapidity of integration Recent transition to EMR/unfamiliarity with telehealth administration and scheduling Additional support staff required Numbers

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Supplementary Appendix B (*Continued*)

Study	Location	Study design	Database	Software (link to)	Type of telehealth/ time of development	Modality	Telehealth service type	Field	Opportunities	Challenges
										Challenges with patient scheduling Lack of up-to-date patient contact information
Martínez-García et al[53]	Spain (Lugo)	Quantitative (prospective observational study: cohort)	PubMed/Scopus	TELEA tool/ integrated into the EMR	Telemedicine/pre-COVID-19	Telemonitoring	At-home monitoring	Confirmed COVID-19 at-home monitoring	Usefulness Increase safety Ease of Maintaining "social distancing" by preventing visits to emergency Departments or clinics Agility of system	Requires having a nationwide unified electronic medical record or procedures for action that have already been tested in other situations it is necessary to involve a large number of professionals to cover departments every day of the week
Maurrasse et al[24]	The United States/ Chicago	Commentary	ISI/PubMed/Scopus/ Scholar	EMR	Telemedicine/after	Video	Treatment, follow-up	Pediatric otolaryngology	High family satisfaction	More time consuming, technical issues with connectivity and the ability to sign on to the correct session, difficulty in perform normal check-in routine, coordinating of care for non-English persons, limited physical examination
Mgbako et al[103]	The United States/ New York	Notes from the field	ISI/Scopus/Scholar	NA	Telemedicine/after	Video/audio	Follow-up	Infectious disease	Continuity of care, avoiding virus exposure	Internet connectivity, low of health literacy
Mittal et al[104]	India (Rajasthan)	Quantitative (descriptive)	PubMed/Scholar	WhatsApp	Telemedicine/during	Mobile phone	teleconsultation	Children with nephrotic syndrome	Avoided a hospital visit Cost saving Early intervention which avoided complications of delayed treatment Maintaining social distancing both for patient and physician	Poor digital literacy
Miu et al[105]	The United States (Dallas, Texas)	quantitative (nonrandomized controlled)	Scholar	Not specified	Telehealth/pre-COVID-19	Teletherapy	Treatment	Psychiatric clinic	Continuity of care in SMI group during COVID-19 Reduced institutional barriers to treatment Reasonable feasibility and acceptability of telehealth to meet mental health needs during the COVID-19 pandemic or other disasters for both general and SMI populations.	–
Morisada et al[106]	The United States (California)	Quantitative (analytical)	PubMed/Scholar	Providers: Epic Haiku application Patients: MyUCDavisHealth or EpicMyChart application	Telemedicine	Video visit	Televisit	Patients with chronic rhinosinusitis (CRS) during COVID-19 pandemic	Easily accessible to patients Reduced exposure risk for physician Facilitating timely triage Streamlining workflow Operational cost containment High patient satisfaction	Inability to perform a complete physical examination with nasal endoscopy Concern for diagnostic accuracy
Nakagawa et al[107]	Japan (Hokkaido)	Quantitative (descriptive)	PubMed/Scopus/ Scholar	Kizuna Web: visual communication system	Telemedicine	Web based Vistual communication for prenatal follow up	Remote checkup and medical care	Maternal care (prenatal checkup and medical care) for women who are at risk of having an underlying disorder or fetal abnormality	Safely undergo remote prenatal checkups and medical care Screening capacity to determine which cases would require hospitalization	–
O'Donovan et al[108]	Ireland (Dublin)	Descriptive	Scopus/Scholar	Blue Eye	Telemedicine	Video communications system + Telephonic consultation	Teleconsultation	Hemophilia care during COVID-19	Augment face-to-face model of care Provider high satisfaction from teleconsultation Improved patients' access to care Reduced travel inconvenience Technology easy to use Improve communication between patients with providers	Patients visual impairment or language difficulties Poor internet access for video consultations Patient preference for a face-to-face interaction Technical difficulties leading to longer consultations than planned in some cases Lack of adequate resources to undertake video consultation Lack of education about telehealth consultation Time consuming of viedioconsultation Lack of patient familiarity and acceptability of teleconsultation

Supplementary Appendix B (*Continued*)

Study	Location	Study design	Database	Software (link to)	Type of telehealth/ time of development	Modality	Telehealth service type	Field	Opportunities	Challenges
										Inability to conduct a physical exam or take a blood test
Panda et al[109]	India (Rishikesh)	Descriptive	Science Direct/ Scopus/Scholar	WhatsApp	Teleconsultation/ after	Telephone/text massage via WhatsApp	Treatement + follow-up	Teleconsultation for children with epilepsy (pediatric neurology specialty clinic)	Atypical seizure semiologies and complex electroclinical epilepsy syndromes accuracy Precise medical advice was provided Feasibility and effectiveness of medical advice	–
Pandey et al[110]	India (Lucknow)	Descriptive	ISI/PubMed/Scopus/ Scholar	WhatsApp + e-mail + telephone	Teleconsultation/ after	WhatsApp + e-mail	diagnosis	Teleconsultation at a tertiary care govemment medical university/ ophthalmology	Feasibility of teleconsultation	Concern for possible legal implications Unavailability of the technology No trust the modality Inability to perform physical examination
Patel et al[111]	The United States (Nashville)	Descriptive	ISI/Scopus/Scholar	Zoom linked with epic EMR	Telemedicine/after	video visits	Telemedicine visits	Ophthalmology	Care safety Care efficiency	Older patient resistance toward using telemedicine Inability to perform physical examination Difficulties setting up virtual encounters (information technology support)
Pinar et al[112]	France (Paris)	Descriptive analytics	ISI/Science Direct/ PubMed/Scholar	Doctolib web site	Telemedicine, after	Visit and followup consultation	Teleconsultation	Urology	Reduced cost High level of satisfaction for patients High level of satisfaction for physicians	Need to a high-speed network Poor-quality videos with low resolution and some even had to end the video consultation Impossibility to exchange of imaging data such as computed tomography scans or magnetic resonance images Inability to Physical examination
Pinzon et al[113]	Indonesia (Yogyakarta)	Descriptive	ISI/Scopus/Scholar	Not applicable	Telemedicine/after	Online video consultations	Consultation	Hospital/ neurological disease patients	Patients safety Providers safety Cost reduction Patient's high satisfaction	Reimbursement system
Poudyal et al[114]	Nepal (Kathmandu)	Descriptive	Scholar	Viber application	Telehealth/after	text messaging	Consul tation + follow-up	Cancer	Facilitate patient-provider communication Improve hospital efficiency Eliminate patient travel Improve health care services	Noncompliant of Viber app with HIPAA
Quinn et al[115]	The United States (New York)	Descriptive	PubMed, Scopus, Scholar	Zoom	Telehealth/after	Video communications	follow-up	Parkinson's disease	Promoting physical activities Patients safety	Internet access Digital competencies Concerned about participant safety Concerned about reliability of the data Technology difficulties
Peden et al[116]	The United States/ California	Commentary	ISI/ PubMed/Scopus/ Scholar	InTouch (a telemedicine platform) and Zoom from HIPAA compliant platforms	Telemedicine/before	Video	Treatment/ follow-up	Multispecialty	Time saving for both patients and providers, risk of virus exposure	Visit fee, physical examination
Perez-Alba et al[117]	Mexico/Monterrey	Commentary	ISI/PubMed/Scopus/ Scholar	Skype	Telemedicine/after	Audio/visual	Evaluation	Infectious disease	Reduction of health care workers exposure to the potentially infected patients, saving protective personal equipment, patients satisfaction	–
Peters and Garg[14]	The United States/ California	Case report	ISI/PubMed/Scopus/ Scholar	Clarity software	Telehealth/after	Video	Education/ treatment/follow up	Endocrinology	Care effectiveness, preventing hospital admission	–
Qualliotine and Orosco[25]	The United States/ California	Case report	ISI/PubMed/Scopus/ Scholar	Not applicable	Felehealth/after	Video	Follow-up	Otolaryngology	Diminish unnecessary exposure	–
Rabuñal et al[118]	Spain (Lugo)	Descriptive	ISI/PubMed/Scholar	TELEA (a web-based electronic tool): directly uploaded to electronic medical record	Telemedicine/pre-COVID-19	Web-based platform	Follow-up	Hospital/COVID-19-positive patients	Avoiding the need of the patients to come to the primary care and emergency services and Decreasing the burden on those health resources Beneficial and allowed us to keep the pandemic under control Telemedicine seems to be a useful and easy-to implement and apply tool for the control of high-risk	–

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Supplementary Appendix B (*Continued*)

Study	Location	Study design	Database	Software (link to)	Type of telehealth/ time of development	Modality	Telehealth service type	Field	Opportunities	Challenges
									patients with COVID-19 who do not meet criteria for hospital admission	
Rahman et al[119]	The United States (Baltimore)	Descriptive	Scholar	Telemedicine platform	Telemedicine/after	Telemedicine platform	Visits	Pain management perioperative (surgery)	Telemedicine acceptance by patients and provider High satisfaction of patients Improve patients access to the clinic Mitigated the risk of COVID-19 (patients safety) Facilitated the engagement of their family members	Building rapport with new patients Reduced ability to assess pain by observation of nonverbal pain behaviors Inability to collect vitals or a urine toxicology at the time of visit Limited physical exam Absence of family members to collaborate collateral information Technology failure Reimbursement State licensure laws
Ramaswamy et al[120]	The United States (New York)	Retrospective cohort study (analytics)	PubMed/Scopus/ Scholar	Linked with electronic health record (epic)	Telemedicine/after	Visit (follow-up + visit+ consultation)	Video visit	General	Higher patients satisfaction Patient safety	–
Rametta et al[49]	The United States (Philadelphia)	Retrospective cohort	PubMed/Scholar	Telemedicine software embedded in epic EMR (linked)	Telehealth/during COVID-19 was possible and successful	Audio–video telemedicine and telephonic	Follow-up and visit	Children's hospital/ pediatric neurology	Improving care safety through decreasing risk of pathogen exposure Improving care effectiveness by allowing information exchange with patient and provider and to inform decision making Improving patient-centered care by allowing accessibility and convenience while maintaining high patients and family satisfaction Improving timely care by avoiding suspension or delays in care during the COVID-19 pandemic Improving care efficiency by reducing the burden on providers or families to travel and time required for in-person encounter Improving care equitability by ensuring meet the needs of diverse patients population from aspects of sex, age, ethnicity and racial Providers satisfaction with the telemedicine process	Technical Issues (software and bandwidth)
Ratliff et al[121]	The United States	Descriptive	ISI/ PubMed/Scopus/ Scholar	Doxy.me platform and Cisco Jabber platform	Telehealth/after	Video	Visit	Wound management	Patients access to care Improve care efficiency Improve patient safety	–
Ratwani et al[122]	The United States	Descriptive	ISI/Scopus/Scholar	On-demand telehealth	Telehealth/after	Video	VISIT	COVID-19 screening	No cost to the patients Access to providers Care safety Prevent patients from visiting health care facilities	–
Reardon et al[123]	Canada	Descriptive	Scholar	Skype for Business	Telehealth/before	Virtual care	Telephonic-video	Pharmacy	Patients high satisfaction Improve quality of care Easy to implement of virtual appointment Timely access to health care Accurate and timely advice	Technological barriers Lack of patient awareness of the telehealth
Rogers et al[124]	The United States/ Providence, Rhode Island	Notes from the field	ISI/Scopus/Scholar	Zoom for health care/telephone	Telehealth/after	Video/audio	Prevention/ treatment/follow-up	Infectious disease	Continuity of care, providers and patient satisfaction, greater accessibility to health care providers and more convenient access to health care	Limited physical examination, technological challenges, privacy concerns
Runfola et al[52]	Italy (Cagliari)	Quantitative descriptive analytics	Scholar	The Skype by Microsoft "Voice over Internet Protocol" (VoIP) software was chosen for video calls phone,	Telemedicine/ during COVID-19 Success based on patients' satisfaction and Telemedicine has been advocated	Video consultations	Teleconsultaion	Bariatric surgery center/bariatric surgery	Reduce the risk of infections Offer medical assistance to the restricted population Eliminate barriers of distance and to save time and direct costs Improving providers and patients	Lack of technical knowledge about telemedicine Lack of time for staff and users training Lack of a regulatory framework for integrating e-health platform with EMR systems

Supplementary Appendix B (*Continued*)

Study	Location	Study design	Database	Software (link to)	Type of telehealth/ time of development	Modality	Telehealth service type	Field	Opportunities	Challenges
				email or WhatsApp messenger/not linked but by e-mail	as a useful tool to relieve pressure on the overwhelmed Health Systems during the COVID-19 pandemic				safety by decreasing risk of pathogen exposure Continuation of specialist medical services Patient satisfaction Reduce structural barriers, especially in disadvantaged areas	Privacy and security requirements because of free video-communication solutions (e.g., WhatsApp, Skype, or Facetime) Patient specific barriers (the absence of basic computer skills and the lack of confidence with video-call systems)
Ryu et al[125]	The United States (Chicago)	Descriptive analytics	Science Direct/ Scholar	Telemedicine platforms	Telemedicine/after	Teleconference/ videoconference visits/e-mail/ telemedicine platforms	Diagnosis and treatment	Neurosurgery	Facilitating communication for the patients with providers with multiple avenue Less travel time for patients Less cost for patients Cost efficient for hospitals Access to greater catchment area	Inability to perform a neurological examination Clinicians concerns about meaningful rapport with patients Lack of trust about diagnosis and treatments Technical barriers (accessing patient imaging) Uncertainty of reimbursement Lack of technical support Administrative barriers Provider lack of training Licensing
Salzano et al[15]	Italy/Napoli	Commentary	ISI/PubMed/Scopus	Phone videoconference services available with most popular smartphone applications/e-mail	Telemedicine/after	Video/audio/text	Follow-up	Cardiology (university tertiary referral center)	Continuity of care, positive impact on HF outcome	Social disparities, IT literacy,
Serper et al[57]	The United States (Philadelphia)	Quantitative (descriptive analytics)	PubMed/Science direct/scholar	Not specified	Telemedicine/pre-COVID-19 success	Video and telephone	Televisit	GI/hepatology	Improving patients and providers satisfaction Improving visit quality by telemedicine Improving care efficiency	Patients and clinicians concerns about lack of physical examination Providers' concerns about privacy, workflow, and technology Patients' concern about fees/charges, privacy, and technology Differences in digital literacy levels among patients
Santonicola et al[126]	Italy (Campania)	Descriptive analytics	Science Direct/ Scopus/Scholar	WhatsApp, Skype e-mail, phone calls	Telemedicine/after	phone calls, image, and text messages	Follow-up (consultation)	Liver transplant patients	Enhancing access to care Reducing costs	The lack of reimbursement for health care providers Limited use of e-technologies in the older population Inadequate number of e-technologies in many hospitals Inability to perform laboratory tests
Sasangohar et al[127]	The United States (Houston)	Descriptive	PubMed/Scopus/ Scholar	Multiple platforms and modalities (e.g., Cisco Webex, Microsoft Teams, facetime, email, telephone calls, the EHR, patient portal communications)	Telehealth/after	Video	Treatment	Telepsychiatry	Patients were receptive and well engaged Accessible services	Need for backup plans and technological fallbacks (support) Managing interruptions and telecommunication learning curves Lack of resources in clients' homes for treatment
Satin et al[128]	The United States	Descriptive analytic	Scopus/Scholar	Telephone or webcam-based platform	Telemedicine/not applicable	Audio–video	Televisit	Spine patients	Patients high satisfaction Reduce costs Increase access to care	Inability for physical examination Issues related to understanding of imaging Low ability to communicate history and symptoms, audio, and video
Semprino et al[129]	Argentina (Tucumán)	Descriptive	Science Direct/ Scopus/Scholar	WhatsApp	Telemedicine	Message and video call	- management of ketogenic diet therapies (KDTs)	Ketogenic diet therapies (KDTs)	Easy access to care Possibility of continuing treatment Parent high satisfaction	–
Shawar et al[130]	The United States (Houston)	Descriptive	Scholar	Videoconference platform	Telehealth	Video	education	Diabetic care	Provider safety	Families with poor computer/technology literacy Families with no telephone, computer, or Internet access Families for whom English is not the primary language Infant or toddler being patients
Shenoy et al[131]	India (Kerala)	Descriptive analytics	ISI, PubMed/Scopus/ Scholar	WhatsApp	Telemedicine/after	Video	Teleconsultation	Rheumatology		Inability without physical examination

(*Continued*)

Supplementary Appendix B (*Continued*)

Study	Location	Study design	Database	Software (link to)	Type of telehealth/ time of development	Modality	Telehealth service type	Field	Opportunities	Challenges
									Patient's high satisfaction Reducing the number of Patients visiting the clinic	
Shur et al[132]	The United States	Descriptive	Scholar	Zoom video communication	Telemedicine/before	Video	Follow-up visits	Metabolism and genetics	Patient safety Providers satisfaction	Licensure barriers continue Scheduling issues Technical problems (security and software update)
Singh et al[133]	India (Ludhiana)	Descriptive analytics	Scopus, Scholar	Not specified	Telemedicine	Telephonic, social media, and e-consultations	Teleconsultation	Patients on anticoagulants	Easy access to specialist (care) Patients' satisfaction Patients safety Providers; safety	–
Smrke et al[54]	The United Kingdom (London)	Quantitative descriptive	Scopus/Scholar	Not applicable (telephone)	Telemedicine	Telephone	Consultation/ therapy/surveillance	Royal Marsden Hospital (RMH)/ Sarcoma Unit	Reduced travel time Reduced travel expenses Convenience Telemedicine appointments shorter than equivalent face-to-face appointments Improve access to care on the individual level	Inability to perform physical examination Infrastructure (i.e., physical quiet space, headset) Lack of nursing presence Lack of private space to have appointment Loss of rapport using phone Use of phone instead of video Documentation
Somani et al[134]	The United Kingdom	Descriptive	ISI, PubMed/Scopus/ Scholar	Microsoft Teams' Application	Telemedicine/after	Video	Consultation	Urological services	Improve patients access to care Continuity of care Patient safety	Clinicians and health care professionals need to be trained
Srivatana et al[26]	The United States/ Ney York city	Brief communication	Science Direct/ Scholar	Zoom, FaceTime	Telehealth/before	Visual	Treatment/follow-up	Nephrology/dialysis provider affiliated with New York-Presbyterian Hospital	Maintain appropriate "social distancing in facilities, continuity of care, limit the risk of exposure, patient high satisfaction	Access to smartphone and loptop, blood sampling
Świerad et al[135]	Poland/Zabrze	Research letter	PubMed	Not applicable	Telemedicine/after	Visual	Evaluation/ treatment/follow-up	Cardiology/ outpatient clinic	Patient satisfaction, provide continuity of care, improve the outcomes and patients' quality of life	Difficulties in first-visit patients evaluation
Tenforde et al[55]	The United States	Descriptive	Scholar	InTouch + Zoom + Facetime	Telemedicine/before	Audiovisual	Visit	Telerehabilitation	Patients' high satisfaction Physicians' high satisfaction Access to care	Limited physical examination Physicians concern about reimbursement Physicians' concerns regarding reimbursement Physicians' lack of knowledge or training Physicians' concern regarding development of patient rapport Inaccessibility for patients with sensory disability or non-English speakers Technology concern
Tenforde et al[136]	The United States (Boston)	Quantitative descriptive analytics	PubMed/Scopus	Institution incorporated audio and visual input and included both InTouch and Zoom software/ Compliance with HIPAA	Telemedicine/pre-COVID-19 successful	audio and visual	New and follow-up visits	Hospital/outpatient musculoskeletal and sports medicine practice	Patients and physicians satisfaction Improvement care quality	Reimbursement concern Lack of knowledge/training Time Technology concern Barriers in performing the physical examination Inaccessibility for patients with sensory disability or non-English speakers
Thomas et al[137]	The United Kingdom (London)	Science direct/ PubMed/Scholar	Descriptive	Telephonic	Telemedicine/after	Telephone audio	Consultations	Tertiary adult allergy center	Patients high satisfaction Time saving Cost-effectiveness Improve patients access to care	Inability for allergy testing The low audio quality Impersonality of telephonic Consultation
Torrente-Rodríguez et al[138]	The United States	Science direct/ Scopus/scholar	Designing and implementing SARS-CoV-2 RapidPlex	A Wireless Graphene-Based Telemedicine Platform (SARS-CoV-2 RapidPlex)	Telemedicine/after	Not applicable	Diagnosis and Monitoring	Infectious disease	Time saving Cost reduction Improve accuracy of COVID-19 patients monitoring Ease of patients access to care	–
van der Velden et al[139]	Netherlands	Implementation of TeleCheck-AF App	ISI/Scopus/Scholar	TeleCheck-AF application	Mobile health (mHealth)	Text data	Teleconsultations	Patients with atrial fibrillation (AF)	Empowering patients to self-manage Improve patient outcomes Increase access to health careCost reduction	Reimbursement barriers Low technology supports

Supplementary Appendix B (*Continued*)

Study	Location	Study design	Database	Software (link to)	Type of telehealth/ time of development	Modality	Telehealth service type	Field	Opportunities	Challenges
Vasta et al[140]	Italy (Turin)	Descriptive	ISI/PubMed/Scopus/ Scholar	Phone call/ videoconferencing	Telemedicine	Audio–video	Televisits	Amyotrophic lateral sclerosis (ALS) tertiary Center	Time-saving Easy to use Patients and caregivers considered themselves satisfied Patients and provider safety	–
von Wrede et al[46]	Germany	Descriptive analytics	Science Direct/ Scopus/Scholar	Phone call/ videoconference system	Telemedicine	Audio–video	Teleconsultation	Tertiary epilepsy center	Short waiting time More comfort No travel expenses Improve patients safety Patients high satisfaction	Lack of personal contact Technical problems Cognitive problems Lack of immediate prescription
Willems et al[141]	Germany	Retrospective cohort (descriptive analytics)	Science Direct/ Scopus/Scholar	Phone call	Telemedicine/after	Telephonic	Telemedicine consultations	Tertiary care center for patients with epilepsy	Patients high satisfaction Physicians high satisfaction	Technical problems Language barrier Increased uncertainty due to missing face-to-face contact
Wood et al[44]	The United States (Philadelphia,)	descriptive cross-sectional	PubMed/Science Direct/Scopus/ Scholar	mobile EHR application/linked with patients portal	Telehealth/pre-COVID-19	Video visits simultaneously	Visit (care)	A medical center (hospital)/ adolescent care	Reduce of exposure of patient to pathogenic Rapid triage of acuity level Linkage to rapid diagnosis of COVID-19 Avoided rehospitalization and other higher levels of care Reduced emotional outbursts Reduced/eliminated purging Achieved prescribed calorie goals Improvement in opioid withdrawal Symptoms Patient-driven decision making regarding procedure Assurance of intact device without signs of infection Deferral of clinic removal visit until after pandemic Avoided higher levels of care in our patients through prompt multidisciplinary intervention, managed mild COVID-19 illness, and delivered gender affirming Care through telehealth	Need for examination of the device Need to limit clinic exposure because of immune suppression Patient desire for removal, despite risks from COVID-19 Limited ability for physical examination Unstable housing Need to limit COVID-19 exposure in congregate living facility Possibility that medical hospitalization may be necessary Need for rapid SARS CoV-2 testing Need for patient self-care instructions Need to keep patient home Consent Need for injection teaching Unable to obtain certain laboratories. including pregnancy status Behavioral health escalations Food refusal and restriction Purging behaviors
Wootton et al[142]	Australia	Descriptive	Scopus/Scholar	Virtual telehealth	Telehealth/after	Videoconferencing	Teleconsultation	Rehabilitation	Improved patients' confidence in what to do during their recovery Patients high satisfaction Improvements in exercise capacity and breathlessness;	–
Wu et al[143]	Taiwan	Descriptive analytics	PubMed/Scholar	Smartphone-enabled telehealth model	Telehealth (mobile health)	Video-based family conference	Televisit (care)	Palliative care unit of the National Taiwan University Hospital	Easy access to telehealth Effective in reaching consensus about care decisions High satisfaction in family members Enabling more family members to join family conferences High satisfaction toward smartphone-enabled telehealth	–
Xu et al[144]	China (Wuhan)	Retrospective cohort study	PubMed/Scopus/ Scholar	WeChat app + eCounseling system	Telemedicine		Monitor the progression of home-quarantined patients with COVID-19	Hospital/home-guaranteed positive COVID-19	Improvement collaborative care and treatment decision Increase the accuracy of diagnosis Reduce the risks of delayed hospitalization due to disease progression Optimize the usage of local medical resources Reduce cross-infection among medical workers and patients Enables patients to self-assess their conditions Reducing the risk of infection among caregiving staff	–
Yildiz and Oksuzoglu[145]	Turkey	Descriptive cross-sectional	ISI/PubMed/Scopus/ Scholar	Video calling, WhatsApp or short	Telemedicine/after	Video, voice and text message	Follow-up visits	Cancer, Oncology Training & Research Hospital	Improve patients' safety Improve providers' safety Cost reduction	Lack of a full physical examination Lack of patient trust to telemedicine visit Reimbursement concerns

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Supplementary Appendix B (*Continued*)

Study	Location	Study design	Database	Software (link to)	Type of telehealth/ time of development	Modality	Telehealth service type	Field	Opportunities	Challenges
				messaging service, voice call						
Yoon et al[146]	The United States	Prospective cohort (descriptive analytic)	Scholar	HIPAA-compliant platform Google Meet and FaceTime	Telemedicine/after	Video	Visits	Neurosurgery	High patients' satisfaction Improve Patients' access to care Improve patients' safety	–
Zhu et al[147]	The United States	Retrospective single-site cohort (descriptive analytic)	PubMed/Scopus/ Scholar	Cisco Webex (Cisco Systems) using audio and video connections.	Telemedicine/before	Audio–video	Visits	Surgery tertiary care hospital	Patients' high satisfaction Provider high satisfaction Appointment convenient with telemedicine Easy access to provider (care) Effective communication between patient-provider Improve patients' safety	Lack of physical examination
Zimmerman et al[148]	The United States	Descriptive	Scholar	Not applicable	Telehealth/after	Video-based visits	Visit	Oncology care	Time saving Patients high satisfaction Improve patients access to care Improve patients' health Patients actively involved in their own health Improve patient- provider communication	Concerns regarding the safety Concern about confidentiality Privacy Lack of physical examination

Supplementary Appendix C Table of opportunities concepts and themes

No.	Article opportunities	Concept (code)	Initial themes	Final themes
1	Keeping patients safe from virus exposure[14,25,26,63,91,103,107,120]	Improved patient safety[6,14,25,26,44,49 52,53,55,63,65,68,70,73,77,85 87,91,92,100,102–104,107,111,113,116–118 120,122,130,133,135,140,145]	Improved safety[6,14,25,26,44,49,52,53 54,55,63,65,68 70,73,77,85,87,91 92,97,100,102–104,106,107,111,113,114,116,117 118,120,122,130,133,135,140,145]	Clinical opportunities[6,14,15,25,26,28,44,45,49 52–55,57,63,65,68,70,73,76–79 80–82,85–88,91–93,96–109,111 113–130,133–140,142,143,145–148]
2	Minimization of patient exposure to pathogen[6,44,49,52,53,55,73,77,85,87,92,100,102,103,111,113,116,117,122,130,133,135,140,145]			
3	Maintaining social distancing for patient[65,68,70,104]			
4	Avoiding the need of the patients to come to the primary care and emergency services[118]			
5	Maintaining social distancing for physician[26,65,104]	Improved physicians safety[26,65,87,92,97,104,106]		
6	Minimization of provider exposure to pathogen[87,92]			
7	Reduce physicians' time of exposure to patients who pose a risk of COVID-19 transmission[97,106]			
8	Reduce the risk of infections[52,114]	Infection control[44,52,54,68,97,114]		
9	Assurance of intact device without signs of infection[44]			
10	Preserving sanitary precautions[68]			
11	Allowed to keep the pandemic under control[54]			
12	Improving infection control of COVID-19[97]			
13	Assurance of intact device without signs of infection[44]			
14	Improve patients access to care[6,15,26,45,54,55,73,85,91,99,101–103,105,106,108,119,121,122,124,126–129,133–139,143,146–148]	Maintaining continuity of care[6,15,26,45,52 54,55,73,81,85,87,91,98,99,101–106,108,119,121,122 124,126–129,133–139,143,146–148]	Maintaining continuity of care[6,15,26,44,45,49 52,54,55,73,76,78,81,85,87,91,96,98 99,101–106,108,114,119,121,122 124–129,133–139,142,143,146–148]	
15	Early intervention avoided complications of delayed care[104]			
16	Appropriate continuation of prenatal care[81]			
17	Access to oncologic care[98]			
18	Greater accessibility to health care providers[124]			
19	More convenient access to health care[124]			
20	Increase safe access to COVID-19–related testing and management[87]			
21	Continuation of specialist medical services[52]			
22	Continuance of outpatient management[91]			
23	Improving patient-centered care by allowing accessibility and convenience[49]	Improved patient-centered care[44,49,76,114,127,142]	Improved patient-centered care[44,49,76,78,96,108,114,125,127,142 147,148]	
24	Improved patients' confidence to care[142]			
25	More personalized care[114]			
26	Proper need meet of patients[76]			
27	Patient-driven decision making Regarding procedure[44,49]			

(*Continued*)

Supplementary Appendix C (*Continued*)

No.	Article opportunities	Concept (code)	Initial themes	Final themes
28	Patients well-engagement[127]			
29	Improve communication between patients with providers[108,114,125,147,148]	Better communication between patients and physicians[78,96,108,114,125,147,148]		
30	Establishing a good alliance between physicians and patients[78]			
31	Adequate opportunity to ask questions, and being understood over the telehealth session[96]			
32	Improving care effectiveness[14,49,80,85,117]	Improving care effectiveness[14,15,44,49,78–80,82,85,88,91,92,96 99,115,117,119,135,138,139,143,148]	Improve care quality[14,15,28,44,49,57,78,79 80,82,85,86,88,91–93,96 97,99,106,109,111,114,115,117 119,121,123,135,138,139,142,143,148]	
33	Mitigated harm and influenced recovery[80]			
34	Better adherence to therapy[78]			
35	Significantly lower relapse rate[78]			
36	Improved patients outcomes[15,88,135,139,148]			
37	Improved patients' quality of life[135]			
38	Patients well-being[78]			
39	Promoting physical activities[115]			
40	Significantly maintained remission[78]			
41	Effective in reaching consensus about care decisions[143]			
42	Optimum glycemic control[79,99]			
43	Improved mental health[44,82,91,96]			
44	Faster and more available medical care[85]			
45	Improved physical health[91]			
46	Achieved prescribed calorie goals[44]			
47	Effectiveness in surveillance[91,92]			
48	Proper patient monitoring[138]			
49	Delivered gender affirming care through telehealth[44]			
50	Improvement in opioid withdrawal Symptoms[44]			
51	Facilitated the engagement of family members to patient care[119,143]			
52	Improving care efficiency[49,57,109,111,114,121,142]	Improving care efficiency[28,44,49,57,86,88,93,106,109 111,114,121,123,139,142,148]		
53	Empowering patients to self-management[139,148]			
54	Improved self-efficacy among caregivers[93]			
55	Approved Suitability and sufficiency self-collected samples[28]			
56	More efficient triage[44,88,106,123]			
57	More accurately consult new referrals[88]			
58	Effective to avoid medicaments shortage[86]			

Supplementary Appendix C (*Continued*)

No.	Article opportunities	Concept (code)	Initial themes	Final themes
59	Multidisciplinary virtual care aiding in the diagnosis[88]	Improving quality of diagnosis[44,57,88,109,123]		
60	Rapid diagnosis of COVID-19[44]			
61	Improve diagnosis accuracy[109,123]			
62	Improving visit quality[57]			
63	Improving quality of images[97]	Improving data quality[97]		
64	Improving interpretation of laboratory data[97]			
65	Prevent hospitalization[14,27,63,104,107,117]	Prevent hospitalization [14,27,44,63,70,84,104,107,117]	Reducing hospital workload [3,6,14,24,26,27,41,42,44–46,49,52,55,57,58 60,63–66,68–71,74,75,84,85,88,90,94 96,104,106–108,112–114,117–120 122–124,128,129,131–133,135–137,140–143,146–149]	Organizational opportunities[3,6,14,22,24,26,27,41,42 44–46,49,52,54,55,57,58,60,63–66,68–70 71,74,75,80,83–88,90,91,94,96,97,100 104–108,112–114,116–120,122–126 128,129,131–133,135–138,140–143,145–149]
66	Reduction of emergency department length of stay[70]			
67	Reduction in length of hospitalization[84]			
68	Avoided rehospitalization and other Higher levels of care[44]			
69	Reducing the number of visits of primary care and emergency services[44,90,118,122,131]	Reducing patients admission in health care organization[44,60,70,90,118,122,131]		
70	Avoided higher levels of care[44]			
71	Reduction in repeated health care encounter[70]			
72	Increase in the telemedicine visits[60]			
73	High satisfaction in family members[24,64,65,96,113,129,136,143]	Improve patient and family satisfaction[3,6,24,26,41,45,46,52,55 57,58,64–66,68,69,71,74,75 85,90,94,96,106,113,114,117,119 120,123,124,128,129,131,133,135–137,140–143,146–149]	Patient and provider satisfaction[3,6,24,26,41,42,45,46,49,52,55,57 58,64–66,68,69,71,74,75,85,88,90 94,96,106,108,112–114,117,119,120,123,124 128,129,131–133,135–137,140–142 143,146–149]	
74	High satisfaction of patients[3,6,26,41,45,46,52,55,57,58,64–66,68 69,71,74,75,85,90,94,96,106,113,114,117,119,120,123,124,128,131,133,135,137,140–142,146–149]			
75	Providers satisfaction[3,42,49,57,58,71,74,75,88,108,112,124,132,136,140,141,147]	Improve provider satisfaction[3,41,42,49,57,58 71,74,75,88,108,112,124,132,136,140,141,147]		
76	Cost reduction[22,41,42,106,112,113,122,125,126,128,137–139,145]	Cost reduction[22,41,42,106,112,113,122 125,126,128,137–139,145]	Cost saving[3,22,41,42,46,54,64,65,70,71 74,80,86,87,91,100,104,106,108,112–114,117,118,122 125,126,128,137,138,145]	
77	Cost savings[3,49,64,65,71,74,86,91,104,113,114,149]	Cost savings[3,6,49,64,65,70,71,74,80,86,87 91,100,104,113,114,117,118,149]		
78	Preserve personal protective equipment[6,70,80,87,100,117]			
79	Savings in disinfection and cleaning cost[100]			
80	Decreasing the burden on health resources[118]			
81	Reduced travel expenses[46,54,65,108,114,125]	Reduced travels expenses[46,54,65,108,114,125]		
82	Time savings[3,46,49,54,64,65,71,74,83,113,114,116,125,137,138,140,148,149]	Timesaving[3,46,49,54,55,64,65,71,74 83,113,114,116,125,137,138,140,148,149]	Time saving[3,46,49,54,55,64,65,71 74,83,113,114,116,125,137,138,140,148,149]	
83	Eliminating travel time[49,55]			

(*Continued*)

Supplementary Appendix C (*Continued*)

No.	Article opportunities	Concept (code)	Initial themes	Final themes
84	Reduced institutional barriers to treatment[105]	Better management of institutional issues[65,105,125]	Organizational performance improvement[45,60,65,97,105,106,114,125]	
85	Access to greater catchment area[125]			
86	Addressing clinic space limits[65]			
87	Improve hospital efficiency[114]	Improved organizational performance[45,60,97,106,114]		
88	Increase in the clinic billed relative value units[60]			
89	Maintaining organization income[45]			
90	Higher claim submission rate[45]			
91	Streamlining workflow[106]			
92	Alleviate the stress of health care workers[97]			
93	Alleviate the workload of health care workers[97]			
94	Telemedicine acceptance by provider[58,71,74,101,119]	Acceptance by providers and patients[22,28,41,42,58,62,64,66,67,69 71,74–76,86,88,96,101,113,119,149]	Usefulness of telehealth[22,28,41,42,53,58,62,64,66,67,69,71 72,74–76,84,86,88,91,96,101,110,113,118,119,149]	Technological opportunities[3,6,22,28,41,42,46,53,54 58,62,64–67,69,71,72,74–76,78,83,84,86 88,90,91,96,101,108,110,113,118,119 140,147,149]
95	Telemedicine acceptance by patients[28,69,74,86,101,119]			
96	Willingness to continue telemedicine in future[22,41,42,58,62,64,67,71,75,76,96,113,149]			
97	Prefer telemedicine over in-person appointments[66]			
98	High patients confidence[88]			
99	Usefulness of telemedicine[53,88,118]	Usefulness[53,84,88,91,118]		
100	The utility of telemedicine[91]			
101	Agility of system[53]			
102	User friendly of home telemonitoring, recommending[84]			
103	Feasibility of teleconsultation[72,74,110]	Feasibility of telehealth[72,74,110]		
104	Telemedicine convenience[54,65,71,90,147]	Technology Convenience[54,65,67,71,90,147]	Ease of use[3,6,46,54,65,67,69,71,75 78,83,90,96,108,118,140,147]	
105	Patients' high eligibility[67]			
106	System' ease of use[3,6,46,69,75,83,96,108,118,140]	System ease of use[3,6,46,69,75,78,83,96,108,118,140]		
107	Electronically transferred laboratory reports was easy and effective[78]			
108	Easy to back up[3]			
109	Care equity for all ethnicity, language and care subgroups[49,52,81]	Improving care equitability[49,52,76,81]	Care equitability[49,52,76,81]	Social opportunities[49,52,76,81]
110	Proper need meet of patients[76]			
111	Reduce barriers, of disadvantaged areas for access to care[52]			
112	Eliminate barriers of distance[52]			

Supplementary Appendix D Table of challenges concepts and themes

No.	Article opportunities	Concept (code)	Primitive themes	Final themes
1	Privacy concerns[52,54,57,60,73,124,148]	Privacy and confidentiality concerns[22,52,54,57,60,73,124,148]	Security, Privacy and Confidentiality concerns[22,52,54,57,60,73,124,148]	Legal challenges[22,44,45,52,54,57,60,73,86,102,110 114,119,124,125,132,148]
2	Cconfidentiality[22,60,148]			
3	Security requirements[52]	Security concerns[52]		
4	Compliance[102,114]	Accordance with institutional framework concerns[44,45,102,114]	Regulations concerns[44,45,52,86,102,110,114,119,125,132]	
5	Informed consent issues[44,45]			
6	lack of regulations[52,86]	lack of a regulatory framework concerns[52,86,110,119,125,132]		
7	legal implications[110]			
8	state licensure laws issues[119,125,132]			
9	Limited physical examination[3,22,24,44,54,57,58 60,62,65,66,68,73,94,106,108,110,111 112,114,116,119,124,125,128,131,136,145,147,148,150]	Inability physical examination[3,22,24,44,54,57,58,60,62,65,66 68,73,94,106,108,110–112,114,116,119,124,125,128,131,136,145,147,148,150]	Clinical decision-making concerns[3,22,24,26,44,54,55,57,58,60,62,65,66,68,72,73 80,90,94,102,106,108,110–112,114,116,119 124–126,128,131,135–137,145,147,148,150]	Clinical challenges 3,22,24,26,27,41,42,44–46,54,55,57,58,60,62,65,66 68,72,73,80,90,94,97,102,106,108,110–112,114,116 119,124–126,128,131,135–137,145,147,148,150
10	lack of tactile feedback[55]	Patient evaluation concerns[55,72,114,135]		
11	Difficulties in first-visit patients evaluation[135]			
12	Absence imaging assessment[114]			
13	inability to check vital signs[72]			
14	lack of personal contact[46]	Limited personal contact[65,66,80,90]		
15	less personal interaction[66]			
16	limitation in appropriateness discuss with physicians[65]			
17	Challenges in care coordination[80]			
18	lack of interpersonal communication[90]			
19	absence of a complete laboratory data[60,126]	Limited laboratory data[26,44,60,68,72,90,102,126,137]		
20	absence of a specific laboratory data[44,68,72]			
21	Difficulties in sampling[26]			
22	Difficulties in testing[44,90,137]			
23	Rapid implementation precluded small scale testing[102]			
24	Significant worsening of clinical status or symptoms[62]	Worsening clinical status[41,42,44,62]	Care efficiency concerns[27,41,42,44–46,62,66,97,106]	
25	Significant worsening of behavior and mental health status[41,42,44]			
26	decreased ability to provide thorough clinical care[66]	Loss of care efficiency[66,97]		
27	Maintaining attention in the virtual session was a common problem[97]			
28	Right timing to prescribe medication[27]	Concerns about accuracy drug administration[27,45,46]		
29	lack of immediate prescription[46]			
30	restrictions on prescriptions for scheduled substances[45]			
31	concern for diagnostic accuracy[106]	Concern about diagnosis accuracy concern[106]		
32	Limited internet access[22,45,115]	Connecting to network Issues[3,22,24,45,49,54,66,67,71–73,75,76,83 86,92,94,102,103,108,112,115,123–125,127,128,137]		

(*Continued*)

Supplementary Appendix D (*Continued*)

No.	Article opportunities	Concept (code)	Primitive themes	Final themes
33	Technical (connection) problems[3,24,54,66,67,71–73,75,76,83,86 92,94,103,115,123,127,128,137]		Connecting to network issues[3,22,24,45,49,54,66,67,71–73,75,76 83,86,90,92,94,102,103,108,111,112,115,123–125,127,128,137]	Technical challenges[3,22,24,26,44–46,49,53,54,66,67 71–73,75,76,83,86,90,92,94,102,103,108,110–112,115 119,123–128,130,132,136,137,141]
34	Technical difficulties with logging in system[24,102,108]			
35	interrupt interventions[71,73]			
36	bandwidth Issues[49,112,124,125]			
37	difficult Initial set-up[90,102,111]	Initial set-up issues[90,102,111]		
38	Need for home monitoring devices[102,127]	Device requirement issues[26,54,73,83,86,102,127,130]	Technology problems[26,44,46,53,54,71,73,83 86,102,108,110,112,119,124,126,127,130 132,136,141]	
39	Need for devices for communication[26,54,73,83,86,130]			
40	Lack of adequate resources to undertake video consultation[108,112,126]	Infrastructure issues[44,53,83,108,110,112,126]		
41	Absence of unified electronic medical record[53]			
42	Need for examination of the device[44]			
43	Concerns about technology[55,57]			
44	concerns about resolution of original medical images[83]			
45	Unavailability of the technology[110]			
46	Software problems[46,71,119,124,132,136,141]	Software problems[46,71,119,124,132,136,141]		
47	Poor cell phone connection[71]	Phone problems 54,71	Phone problems[54,71]	
48	Loss of rapport using phone[54]			
49	provider availability[22,80]	Supporting issues[22,53,54,80,125]	Structure[22,53,54,80,102,125]	Organizational challenges 22,24,44,45,52–54,57,60,76,77,80,90,92,97,102,108 125,134,136,150
50	requiring additional support staff[102]			
51	large number of involved professionals[53]			
52	Lack of nursing presence[54,80]			
53	Administrative barriers[125]	Administrative issues[125]		
54	Rapidity of integration to current practice[102]	Integration issues[102]		
55	Difficulties in interdisciplinary work[60]	Team working[60]	Process[57,60,92]	
56	Communication of new workflows and protocols[92]	protocols and workflows[57,92]		
57	providers' concerns about workflow[57]			
58	Decrease of productivity[76]	Reduced productivity 76,77	Managerial[24,44,45,52,76,77,80 90,97,102,108,125,134,136,150]	
59	Clinicians must take additional efforts[77]			
60	More time consuming[24,80,90,97,108,150]	Time-consuming 24,80,90,97,108,150		
61	Challenges with patient scheduling[80,102]	scheduling issue[45,80,102,108]		
62	Challenges with providers' scheduling[45,80]			
63	Unfamiliarity with scheduling[102,108]			
64	Unfamiliarity with telehealth[102,108]	Lack of knowledge/training 44,52,102,108,125,134,136,150		
65	lack of time for staff and users training[52]			
66	Need for patient self-care instructions[44]			

Supplementary Appendix D (*Continued*)

No.	Article opportunities	Concept (code)	Primitive themes	Final themes
67	Need for injection teaching[44]			
68	Lack of knowledge/training[108,125,150]			
69	Lack of clinicians and health care training[134,136]			
70	Technology literacy gap[15,57,60,104,130]	Literacy gap[15,57,60,103,104,130]	Patient-related issues[15,52,57,60,73,103,104,115,123,130,136]	Socio/financial challenges[15,24,44,46,52,56,57,60 62,65,73,75,78,80,83,97,102–104,108,110,111,113,115 116,119,123,126,130,136,139,141,145,148,150
71	Low health literacy[103]			
72	Patient specific barriers (the absence of basic computer skills and the lack of confidence with video-call systems)[52]	Lack of computer skill and knowledge 52,73,115,123,136		
73	lack of patient awareness of the telehealth[123]			
74	patients' difficulty with navigating the telehealth visit platform[136]			
75	limited experience with the communication method[73]			
76	Lack of technical knowledge about telemedicine[52]			
77	digital competencies issues[115]			
78	Language disparities in use the system[24,56,60,97,102,108,111,126,130,136,141,150]	Social disparities[15,24,44,56,60,75,78,97,102,108 111,126,130,136,141,150]	Social disparities[15,24,44,56,60,75,78 97,102,108,111,126,130,136,141,150]	
79	Sex disparities in use the system[56,75,111,126,130]			
80	Age disparities in use the system[56,75,111,126,130]			
81	Income disparities in use the system[56,75,111,126,130]			
82	Insurance barriers in use the system[75,78]			
83	educational disparities in use the system [78]			
84	Unspecified Social disparities[15,44]			
85	inaccessibility for some special patients[136,150]			
86	Discomfort with telehealth visits and technology[102]	Lack of confidence 52,60,80,102,108,110,141,145	Confidence and concern[46,52,57,60,62,65,80 83,102,108,110,141,145,148,150]	
87	provider discomfort with clinical decision-making[60]			
88	increased uncertainty due to missing face-to-face contact[141]			
89	lack of patient trust to telemedicine visit[145]			
90	patient preference for a face-to-face interaction[80,108]			
91	Patient lack of confidence with systems[52,110]			
92	concerns regarding the safety[148]	Concern[46,57,62,65,83,148,150]		
93	cognitive problems[46]			
94	negative impact on patient perception of care[65]			
95	Needed family help[62]			
96	providers' concerns about technology[57]			
97	Reimbursements barriers[60,113,119,126,136,139,145,150]	Reimbursement concerns[60,113,119,126,136,139,145,150]	Reimbursement and billing issues[57,60,102,113,116,119,126,136,139,145,150]	
98	billing issues[102]	Billing issues[57,102,116]		

(*Continued*)

Supplementary Appendix D (*Continued*)

No.	Article opportunities	Concept (code)	Primitive themes	Final themes
99	Patients' concern about fees/charges[57,116]			
100	health information quality[22]	Poor data quality[22,82,102,115]	Poor data quality[22,54,82,102,115,119,136]	Data quality challenges[22,54,82,102,115,119,136]
101	Limitation in presenting proper amount of information[82]			
102	Limited data on the use of telehealth in routine obstetrics[102]			
103	Lack of up-to-date patient contact Information[102]			
104	concerned about reliability of the data[115]			
105	Poor documentation[54]	Poor documentation[54,119,136]		
106	building rapport with new patients issues[119,136]			