Assessing the Challenges of Virtual Clinics on Patient Care: Barriers, and Opportunities for Improvement

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Abstract

Background: Virtual clinics have transformed the healthcare across the world, especially in response of the COVID-19 pandemic. These clinics provide more access to care, but they also come with a number of difficulties that may have an impact on patient satisfaction and outcomes.

Objective: This study aimed to measure the barriers faced by the patients in virtual clinic settings and identify opportunities for improvement in the virtual delivery of health care.

Methodology: This study includes conducting a systematic review of peer-reviewed articles from several databases, with an emphasis on virtual healthcare concerns. A total of 22 studies published between 2019 and 2024 that were specifically focused on the patient's perspective was included. Data extraction followed the guidelines of the PRISMA framework, whereas assessing bias required the use of the QUADAS-2 tool to address methodological quality and aspects of transparency.

Results: Preliminary findings reveal that technical issues, limited access to digital literacy skills, and emotional barriers have limited patients' participation as well as their level of satisfaction in terms of virtual clinics. Better prospects for improvement were revealed from a review of issues that need enhancement in infrastructure, development of more digital literacy courses, and more effective training of healthcare providers for the integration of virtual care with a patient-centric approach.

Conclusion: Solutions to overcome barriers in virtual clinics improve effectiveness, accessibility, and patient care. Future studies should focus on long-term results and integration within traditional healthcare.

Keywords: Virtual Clinics, Telemedicine, Patient Satisfaction, Digital Literacy, Technical, Infrastructure

1. Introduction

Healthcare delivery has undergone rapid evolution, especially with the emergence of virtual clinics (Gilbert et al., 2020). Virtual healthcare, sometimes considered as a subset of telemedicine, is a process through which medical consultations and services are provided remotely via technology. It has been gaining considerable importance over the past years. This growth has exponentially been promoted by the COVID-19 pandemic, which has had health systems around the world adapting at breakneck speed to solutions brought about by the restriction of physical movement and concerns over infection control (Mullick et al., 2020). The shift towards virtual clinics brings many benefits and makes healthcare more available and convenient for patients, especially those who reside in remote or underserved areas. It has proved cost-effective on both sides of the patient and the health care provider, minimizing travel costs, overheads for the clinics, and optimizing resource usage (Grant, 2024).

Although these benefits are self-evident, virtual clinics also have some challenges, specifically in terms of care and satisfaction of patients. While many patients have difficulty adjusting to the new method of interacting with healthcare providers, especially those who are unaware of the digital technologies or those who are not regularly accessing a reliable internet service (AlJaloud et al., 2023). Moreover, the impossibility of conducting proper physical examinations prevents establishing correct diagnoses and proper care measures, thus affecting the patient's satisfaction and the overall safety of health (Ftouni et al., 2022). Communication problems in virtual environments also make it difficult for patients to communicate their concerns properly, and it is often hard for healthcare providers to comprehend non-verbal signals, which might be important for overall understanding of the patient's health condition (Bryant et al., 2020). These challenges will likely further decrease the confidence levels of patients in virtual care for those with chronic diseases or complex conditions.

Some of the critical issues regarding patient experience in virtual clinics relate to technical problems, privacy concerns, and the quality of interaction with the provider (Aashima et al., 2021). Technological literacy and access to resources are so important so that older populations or even individuals from low-income backgrounds would not be held back from using full services offered through virtual health means. Furthermore, problems regarding data security and patient confidentiality are raised in virtual settings, where sensitive information may be subject to breaches (Hardcastle & Ogbogu, 2020). The impersonality of consultations in virtual settings also works to undermine that trust and rapport frequently developed with traditional face-to-face settings that impact overall satisfaction and outcomes.

These challenges could be effectively addressed by concerted efforts from healthcare providers, policymakers, and technology developers. Improvement in both technological infrastructure as well as in digital literacy among patients can improve the effectiveness of virtual clinics (Joughin et al., 2021; Mbunge, Batani, et al., 2022). Accessible, user-friendly interfaces for users, patient training sessions, and high-quality internet access are some of the steps that need to be taken in that direction. In addition, virtual healthcare systems must promote patient-centered care by enhancing communication technologies for better engagement between providers and patients (Mitchell et al., 2019). Hybrid models of care that complement mostly virtual consultations with the need for timely visits in person can address the gap between convenience and comprehensive care (Mold et al., 2021). By addressing these concerns, virtual clinics will be better able to satisfy the demands of patients, ensuring that the benefits of virtual healthcare, such as accessibility, convenience, and cost-effectiveness, are fully achieved without sacrificing service quality or patient satisfaction.

This systematic literature review aims to outline the areas where patients encounter barriers in accessing and engaging with virtual clinics and provides practical recommendations for improvement. The review of current research will examine the extent of patient difficulties encountered while accessing virtual clinics, such as technological difficulties, communication issues, and privacy concerns, and evaluates the implications for the quality of care. It also attempts to suggest some evidence-based interventions to bridge these barriers focusing on strategies that would most likely improve the likelihood of enhancing patient satisfaction, optimizing the outcome, and sustain it in the long run for virtual healthcare models. Through these recommendations, the objective is to create a framework for healthcare providers and policymakers that can use to facilitate improvement in the virtual clinic experience for all patients.

2. Methodology

A varied set of several databases, including PubMed, Scopus, Web of Science, and Google Scholar, was utilized for performing the search keywords with reference to relevant studies from December 2019 to October 2024. The keywords used for this study,

including "virtual healthcare," "telemedicine challenges," "patient satisfaction," "telehealth barriers," "digital divide in healthcare," and "telehealth privacy concerns," were included in the search. As a result of this extensive search process, 1,356 articles were identified, mainly from PubMed and Google Scholar. From an extensive literature review and filtering out applicable literature, based on criteria of relevance, quality, and appropriateness to the study objectives, 22 research studies were shortlisted to be included in this final review. These studies were selected based on their data on the barriers to patients in a virtual healthcare setting and which could add meaningful insights to enhance effectiveness and impact positively on the patient experience of services using telehealth or virtual healthcare.

2.1 Selection Criteria

Table 1: Selection Criteria for the studies

Inclusion	Exclusion
- Articles (preferably full-text) published in peer-reviewed journals within the last six years (2019-2024).	- Articles published in languages other than English. - Unpublished studies or preprints.
- Research on virtual healthcare services and their impact on patient care, with a focus on barriers, challenges, patient satisfaction, and outcomes. - Studies addressing telehealth barriers such as digital divide, privacy, or technology literacy.	- Research focusing solely on provider perspectives or not directly addressing patient care. - Articles discussing virtual care in sectors outside of healthcare (e.g., education, business).
- Empirical studies including clinical trials, observational studies (e.g., cohort and cross-sectional), randomized controlled trials (RCTs), systematic reviews, and meta-analyses that examine patient experiences in virtual clinics.	- Commentaries, opinion pieces, editorials, and studies that lack empirical data. - Studies where abstract information is incomplete or unclear, leading to ambiguity in reporting relevant data.
- Research focusing on patients' experiences, challenges, and satisfaction with virtual healthcare, including those involving qualitative, quantitative, or mixed-methods approaches.	- Studies without a patient-centered focus (i.e., lacking discussion of patient barriers or outcomes). - Studies with unclear reporting of key patient data such as sample sizes, outcomes, or treatment experiences.
- Systematic reviews and meta-analyses that offer a comprehensive view of the challenges and barriers in virtual healthcare, expanding the scope of individual studies to present a broader empirical understanding.	- Reviews or meta-analyses that do not provide sufficient detail regarding patient challenges, satisfaction, or experiences in virtual care settings. - Articles with methodological weaknesses or limited replicability.
- Abstracts with clear reporting of key data (e.g., sample population, group sizes, and treatment outcomes) were considered to ensure broader inclusion of relevant data. - Studies with a strong focus on patient barriers in virtual clinics.	- Abstracts lacking key information such as total sample size, treatment outcomes, or detailed patient experiences, even if relevant information is present in the title.

2.2 Data Extraction

2.2.1 Data Collection Method

The data obtained for this systematic review were peer-reviewed studies that discussed challenges and barriers to patients in virtual healthcare. Important data included patient satisfaction, technological barriers, privacy concerns, communication issues,

and statistical measures such as sample sizes, confidence intervals, and significance levels. Initially, 1,356 records were found in the databases. After removing duplicates (n =312). Applying automation tools to filter ineligible studies (n =181) and records removed for other reasons (n =90), there were about 773 records left for screening. From that, a total of 451 records were excluded for not meeting the criteria of inclusion studies. The remaining 322 records left for evaluation from which 161 were excluded as they were before the year 2019, 97 were excluded due to sources not written in the English language, and 42 studies were excluded for irrelevant data or with no empirical outcome. Finally, 22 studies were included all of them published within 2019-2024, focusing on the patient experiences in virtual healthcare and telemedicine as seen in Figure 1. Demographics were viewed as important but secondary to the primary aim of efficacy and the patient's reported difficulties, as shown in Table 2.

Table 2: Characteristics of the participants included in the reviewed studies

Study	Participants	Challenges	Opportunities	Outcomes	Satisfaction	Technology Used
Study 1	NR	Reduced face-to-face consultations, varied satisfaction levels, difficulty in diagnostics	Rapid implementation of virtual consultations, reduced exposure during the pandemic	High patient satisfaction; 87% virtual consultations achieved	90/100 (High patient satisfaction)	Microsoft Teams, Video consultations
Study 2	30 articles reviewed	Infrastructure issues, technological limitations, privacy concerns	Improvement of telemedicine efficiency, increasing access to care	TLM improved care but required better management	NR	Zoom, Skype, various telehealth platforms
Study 3	67 patients (Mean age: 75)	Cognitive, sensory impairments, technical difficulties	Feasibility for preoperative medical optimization, reducing in-person visits for older adults	Enhanced understanding of medical conditions and satisfaction	90.6% for understanding conditions, 96.2% for participation	Video conferencing
Study 4	95 clinicians	Diagnostic limitations, lack of patient access to tests, difficult physical examinations	Long-term enabler for remote diagnostics and virtual care	Continuity in service delivery	NR	Zoom, Telephone consultations
Study 5	8 patients, 1 physician, and 1 office manager	Missed diagnoses, lack of specialist care coordination	High patient engagement, flexible hybrid model integration	Empowerment of patients, improved asynchronous communication	High satisfaction with the hybrid model	Email, Text, Video conferencing
Study 6	20 participants (6 providers, 7 patients, 7 caregivers)	Technology adoption for older adults, limited access to devices and internet	Customization of virtual care programs, increasing digital literacy	Key barriers and facilitators identified for older adults	NR	Telehealth platforms, Telephone

Study 7	207 clinicians	Limited patient access to technology, Wi-Fi/connectivity issues in rural areas	Continued integration of virtual visits post-pandemic	Clinician satisfaction, technical issues in rural areas	High clinician satisfaction	OTN (Ontario Telemedicine Network), Zoom
Study 8	135 clinicians and patients	Inconsistent access to technology, lack of necessary equipment	Enhanced access to maternity care, reduced in-person visit requirements	Flexible scheduling during pregnancy, improved access	Positive feedback from clinicians and patients	Telephone, Zoom, Online portals
Study 9	60 patients	Difficulty establishing rapport and trust virtually	Expanded access to mental health care, flexibility for patients	High engagement and satisfaction with virtual mental health support	High satisfaction	Zoom, Skype, Telehealth apps
Study 10	NR	Connectivity issues, technology difficulties, diagnostic challenges	Support for treatment continuation during COVID-19, telemonitoring	Mixed success in sustaining remote oncology care post-COVID	NR	Video consultations, Telephone
Study 11	223 surgical OPD patients; 20 followed-up in VC	Barriers to VC use (47%)	Improved patient satisfaction; Efficiency in care delivery	Higher satisfaction in VC (100% vs. 83.9% traditional OPD); Time and cost savings (P=.003)	100% in VC; 83.9% in traditional OPD	Virtual clinic (VC)
Study 12	439 patients from primary healthcare centers	Face-to-face interaction limitation (53.8%)	Convenience of virtual clinics; High response rate	68.1% overall satisfaction; Significant factors include gender, age, education	68.10%	Virtual clinics (during COVID-19)
Study 13	998 healthcare providers across specialties	Inability to perform physical exams; Technical difficulties	Provider support for VC; Enhanced care efficiency	Quality of VC rated equivalent/higher than in-person care; Specialties rated differently	High satisfaction in mental health providers	Video and phone telehealth
Study 14	15 new mothers	Balancing routines with care needs	Comfort, convenience, and communication	High satisfaction; Perceived emotional support	High satisfaction	Video conferencing

Study 15	Not specified	Barriers: lack of awareness, costs, inefficiencies, medicolegal concerns	Growth potential for telemedicine	Addressed barriers with mandates; Need for continued investment	Not quantified	Telemedicine
Study 16	249 older adults (avg. age 84.6)	Technology familiarity, hearing difficulties, language barriers	Opportunity for improved access to care	Identified significant barriers to telemedicine use; Suggestions for improvement	Not quantified	Telephonic and video visits
Study 17	148 patients; 10 ophthalmologists; 10 data staff	Communication and process inefficiencies	Acceptance of glaucoma virtual clinics	High confidence in testing and likelihood of recommending service	High confidence and recommendability	Virtual clinics
Study 18	Not specified	Absence of policy; Technological barriers; Cultural bias	Improved efficiency and resource utilization	Highlights benefits of telemedicine; Need for frameworks	Not quantified	Telemedicine and virtual health services
Study 19	48,144 patients, 146 providers across 12 countries	Technical challenges, lack of physical examination	High satisfaction, convenience, accessibility	Strong preference for continued use of telemedicine; Satisfactory on various measures (e.g., addressing concerns, communication)	High satisfaction across demographics	Telemedicine, virtual encounters
Study 20	Not specified	High travel costs, risky physical interactions during COVID-19	Reduces hospital visits and workflow improvement	Telemedicine streamlines patient monitoring and recovery management	Not quantified	Telemedicine technologies (video conferencing, health apps)
Study 21	1,274 patients at King Faisal Specialist Hospital, Saudi Arabia	Limited awareness of virtual clinics	Opportunity to enhance knowledge about virtual services	High satisfaction (75.67% satisfied); Desire to continue virtual services post-pandemic (48.18%)	75.67% satisfaction	Online questionnaire-based survey for virtual clinics
Study 22	148 pregnant women, 37 healthcare professionals in the UK	Transition from face-to-face to virtual care	Potential for long-term implementation of virtual clinics	86% of women rated experience as good/very good; 67% of HCPs rated	86% satisfaction from women; 67% satisfaction from HCPs	Virtual antenatal clinics (telephone

				experience positively		consultations)

2.3 Data Extraction & Analysis

- Articles on telemedicine and virtual healthcare services were identified, screened, appraised, and included with the 2020 PRISMA guidelines.
- Modifications have been applied to include abstracts to avoid missing key findings from inaccessible articles along with other sources such as registries and websites as per the requirements set from the PRISMA reporting standards.
- Initially, article inclusion criteria included the research title, first author, demographic parameters (limited to participant gender and age), intervention kinds, control groups, outcomes of interest, and evidence quality. Screening was undertaken in two rounds, commencing with titles and abstracts, followed by full-text evaluations. Studies with unavailable complete texts were excluded.
- Where appropriate, information missing from a study's abstract was verified with the main body and data tables to ensure all that information was incorporated fully.
- Systematic reviews and cross sectional studies on the applications of telemedicine in various health care settings, such as virtual consultations and antenatal care, were used to identify relevant studies that would allow more scopes for relevant literature without adding reviews that were not pertinent to the focus of this study.

2.4 Risk of Bias Assessment

For the current systematic review, the risk of bias assessment was evaluated using the QUADAS-2 (Quality Assessment of Diagnostic Accuracy Studies) tool which was used to assess methodological quality related to diagnostic studies (Yang et al., 2021). It is designed to assess the quality of diagnostic studies focusing on four domains: patient selection, index test, reference standard, and flow and timing. The risk of bias and applicability concerns are interrogated in every domain. The end result, therefore, provides a comprehensive review of the design and conduct of a study. The review of the included studies was quite comprehensive, with the focus on how well each of them followed the QUADAS-2 criteria. Identified biases in literature were documented, and considerations about their implications on the validity of the findings were given. All this was aimed at assuring that the evidence was overall transparently reported and critically appraised.

3. Results

3.1 Search Results

Table 3: Characteristics of the included studies

Study	Authors	Publication Year	Methodology Design	Findings
Study 1 (Gilbert et al., 2020)	Anthony William Gilbert, Joe C T Billany, Ruth Adam, Luke Martin, Rebecca Tobin, Shiv Bagdai, Noreen Galvin, Ian Farr, Adam Allain, Lucy Davies, John Bateson	2020	Quality improvement initiative using the PDSA cycle	Rapid implementation of virtual consultations at RNOH achieved 87% virtual consultations in 6 weeks; high patient satisfaction (90/100) but preference for video consultations was less than 50% outside of COVID-19.
Study 2 (Jafarzadeh et al., 2022)	Jafarzadeh, Faria; Rahmani, Faezeh; Azadmehr, Farhad; Falaki, Mojgan; Nazari, Mahboubeh	2022	Literature review of 30 related articles	Telemedicine (TLM) significantly facilitates health services across 13 major areas; challenges include economic evaluations and the need

			on telemedicine	for infrastructure improvements to overcome obstacles.
Study 3 (Joughin et al., 2021)	Andrea Joughin, Sarah Ibitoye, Amy Crees, David Shipway, Philip Braude	2021	Mixed methods study with semi-structured interviews and quantitative benchmarking	Piloted a virtual clinic for preoperative health optimization; 67 consultations showed improved patient understanding (90.6%); clinicians preferred video consultations (89.7%).
Study 4 (Vas et al., 2022)	Venessa Vas, Shirley North, Tiago Rua, Daniella Chilton, Michaela Cashman, Bharti Malhotra, Toby Garrood	2022	Qualitative study with in-depth interviews of clinicians	Interviews with 95 clinicians revealed perceived benefits of virtual consultations but highlighted challenges in care delivery and the need for patient access to diagnostics.
Study 5 (Burton et al., 2022)	Lindsay Burton ; Kathy L Rush ; Mindy A Smith ; Selena Davis ; Patricia Rodriguez Echeverria; Lina Suazo Hidalgo; Matthias Görges	2022	Focus groups with patients and providers from a rural micropractice	High patient engagement and satisfaction in a hybrid care model; concerns over missed diagnoses in virtual care; deferred care was reported during COVID-19.
Study 6 (Watt et al., 2022)	Jennifer A Watt, Christine Fahim, Sharon E Straus, Zahra Goodarzi	2022	Qualitative semi-structured interviews with patients, caregivers, and providers	Identified barriers and facilitators for virtual care uptake in geriatrics; emphasis on tailoring implementation for older adults post-COVID-19.
Study 7 (Mohammed et al., 2021)	Heba Tallah Mohammed , Lirije Hyseni ,Victoria Bui ,Beth Gerritsen ,Katherine Fuller ,Jihyun Sung ,Mohamed Alarakhia	2021	Online survey of primary care physicians and nurse practitioners	96.6% offered virtual visits during the pandemic; average of 66.4% of visits were virtual, with anticipated reduction to 43.9% post-pandemic; barriers included access to technology and integration issues.
Study 8 (Ftouni et al., 2022)	Racha Ftouni, Baraa AlJardali, Maya Hamdanieh, Louna Ftouni & Nariman Salem	2022	Systematic review following PRISMA	85% of patients preferred virtual visits for routine follow-ups; major concerns included technology literacy and the importance of physical examinations.
Study 9 (Lavin et al., 2020)	Bruce Lavin, Cassie Dormond , Morris H. Scantlebury, Pierre-Yves Frouin, Martin J. Brodie	2020	A review-based approach focusing on the application of virtual clinics and telehealth for epilepsy management.	Virtual clinics enhance epilepsy care access, enable remote EEG monitoring, and address care gaps during COVID-19.
Study 10 (De Vera et al., 2022)	Kristina De Vera, Priyanka Challa, Rebecca H. Liu, Kaitlin Fuller, Anam Shahil Feroz, Anissa Gamble, Eunice Leung, Emily Seto	2022	Review of regulatory and reimbursement policies for telehealth	Highlighted inconsistencies in reimbursement policies across states; recommendations for policy standardization to facilitate broader telehealth adoption.

Study 11 (Rutherford et al., 2020)	Emily Rutherford, Roghinio Noray, Caolán Ó HEarráin, Kevin Quinlan, Aisling Hegarty, Lenin Ekpotu, Chinedum Arize, Fiyinfoluwa Fabamwo, Abdulaziz Alrubaiaan, Avinash Bhupalan, Abdulla Alshehhi, Colm Power, Arnold David Konrad Hill	2020	Pilot study; cross-sectional questionnaire (n=223) of patient satisfaction; follow-up survey for endoscopy/day surgery patients (n=20)	High satisfaction in VC (100% vs. 83.9% in traditional OPD); significant savings in time (P=.003) and costs for patients and institution.
Study 12 (Alharbi et al., 2021)	Alharbi, Khalid G.; Aldosari, Mohammed N.; Alhassan, Abdularhman M.; Alshallal, Khalid A.; Altamimi, Abdullah M.; Altulaihi, Bader A.	2021	Cross-sectional study; online validated questionnaire; participants with virtual clinic experience (n=439)	68.1% overall satisfaction; significant factors included gender, age group, education; 53.8% reported missing face-to-face interaction.
Study 13 (Connolly et al., 2021)	Connolly, Samantha L. PhD*; Gifford, Allen L. MD*; Miller, Christopher J. PhD*; Bauer, Mark S. MD*; Lehmann, Lisa S. MD, PhD; Charness, Michael E. MD.	2021	Voluntary survey of healthcare providers across specialties (n=998)	Most providers rated VC equivalent or higher in quality/efficiency than in-person care; highest quality ratings for video vs. phone; major challenges included inability to conduct physical exams.
Study 14 (Saad et al., 2021)	Megan Saad, Sophy Chan, Lisa Nguyen, Siddhartha Srivastava & Ramana Appireddy	2021	Semi-structured interviews (n=15) with new mothers; thematic analysis	High satisfaction with VC; benefits included comfort, convenience, and emotional support; suggested potential for improved compliance to obstetric care.
Study 15 (Makhni et al., 2020)	Makhni, Melvin C. MD, MBA; Riew, Grant J. AB; Sumathipala, Marissa G.	2020	Review of barriers to telemedicine; literature synthesis	Identified barriers: lack of awareness, implementation costs, perceived inefficiencies, concern for medicolegal liability; suggested continued investment and regulation refinement for telemedicine adoption.
Study 16 (Mao et al., 2022)	Mao, Alice; Tam, Lydia; Xu, Audrey; Osborn, Kim; Sheffrin, Meera; Gould, Christine; Schillinger, Erika; Martin, Marina; Mesias, Matthew.	2022	Mixed methods needs assessment; surveys and semi-structured interviews (n=249) with older adults	Major barriers included technology familiarity, hearing difficulties, and language barriers; 36.5% comfortable with video visits; need for in-person support highlighted.
Study 17 (Gunn et al., 2022)	Patrick J. G. Gunn, Joanne R. Marks, Leon Au, Simon Read, Heather Waterman,	2021	Mixed methods; patient	High confidence in service providers; key themes included patient experience and clinician

	Paul G. D. Spry & Robert A. Harper		satisfaction surveys (n=148) and interviews with patients and clinicians	perceptions; dissatisfaction linked to communication issues rather than disease complexity.
Study 18 (Mbunge, Muchemwa, et al., 2022)	Elliot Mbunge, Benhildah Muchemwa, John Batani	2022	Systematic literature review on telemedicine in sub-Saharan Africa	Telemedicine offers efficiency and resource utilization; barriers include lack of policy, funding issues, and cultural resistance; recommendations for policy development and education included.
Study 19 (Aashima et al., 2021)	Aashima, Mehak Nanda, and Rajesh Sharma	2021	Electronic literature search; review of studies on patient perspectives on telemedicine	Findings not fully available; context indicates a review of patients' preferences for virtual healthcare services and insights on satisfaction levels.
Study 20 (Haleem et al., 2021)	Abid Haleem, Mohd Javaid, Ravi Pratap Singh , Rajiv Suman	2021	Comprehensive review of existing literature and technological case studies	Telemedicine improves cost-efficiency, patient monitoring, and follow-up care, but supplements rather than replaces physical consultations.
Study 21 (AlJaloud et al., 2023)	AlHanouf M AlJaloud, Abdulaziz Al Suwyed, Khalid H Al Zoman, Mohammad Y Tabbaa, Asirvatham Alwin Robert, Abeer M Al-Nowaiser, Faisal Alotaibi, Mohammed A Alfaifi, and Sultan A Almubarak	2023	Online questionnaire-based survey with questions in both Arabic and English	Virtual clinics are highly satisfied and highly sought after, suggesting the need for increased patient awareness and knowledge about these services post-COVID-19.
Study 22 (Quinn et al., 2021)	Lauren Marie Quinn; Oluwafumbi Olajide; Marsha Green; Hazem Sayed; Humera Ansar	2021	Questionnaire Study	The study reveals high satisfaction with telephone antenatal clinics during the pandemic, indicating the shift towards digitalization of antenatal care for 21st-century patients and professionals.

3.2 PRISMA Flowchart

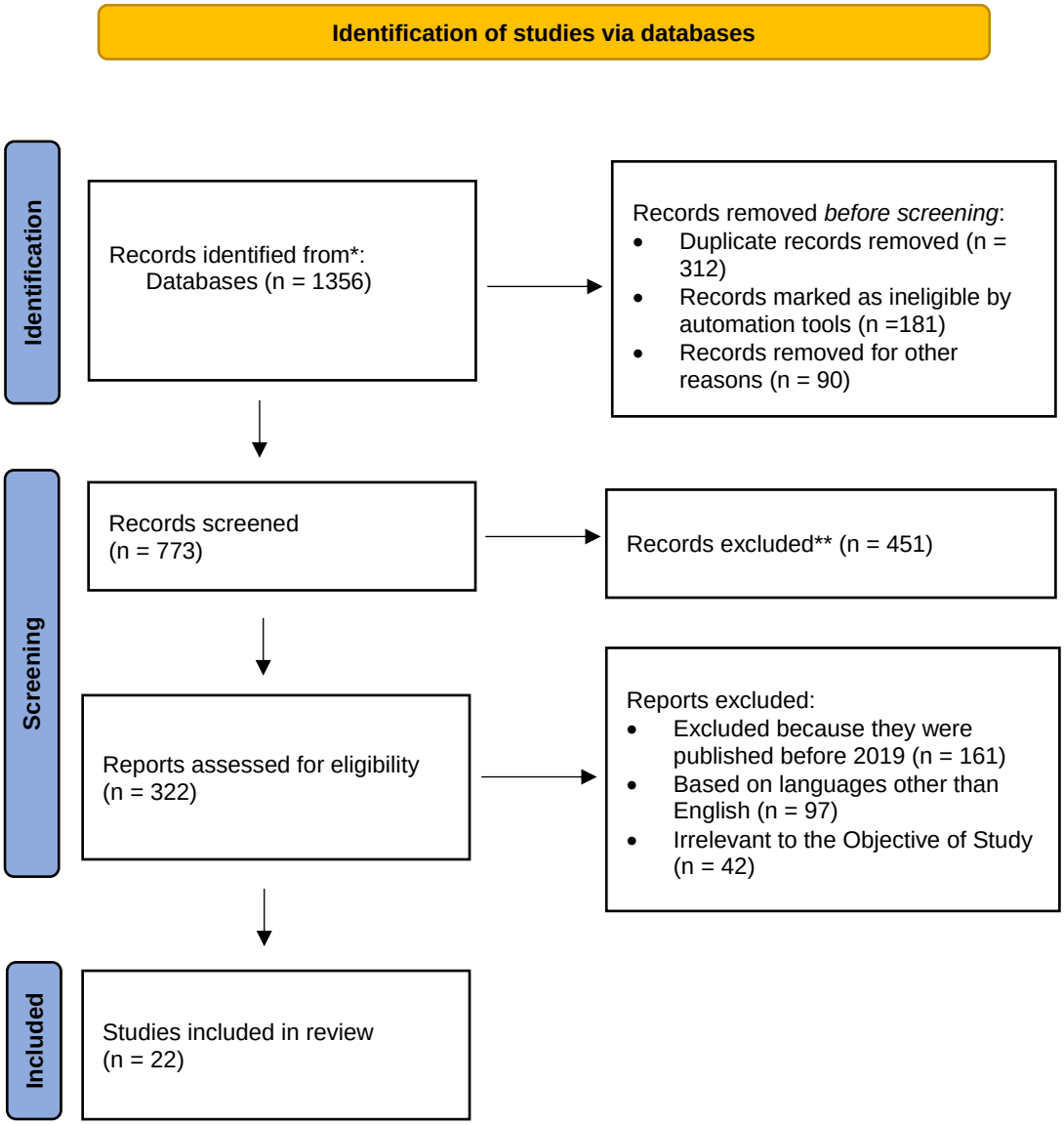

Figure 1. PRISMA Flowchart for article selection

3.3 Summary of the Study Designs

In this review, the articles included as per inclusion criteria comprised of 8 quantitative studies, 4 qualitative studies, 4 mixed methods studies, 2 systematic reviews, and 4 literature reviews. The majority of the studies (8 studies) were quantitative in nature, as shown in Table 4.

Table 4: Summary of the Study Designs

Study design	**Number of articles**	**Distribution (%)**
Quantitative	8	36.36
Qualitative	4	18.18
Mixed Methods	4	18.18
Systematic Reviews	2	9.09
Literature Reviews	4	18.18

TOTAL	**22**	**100**

3.4 Quality Assessment of the Included Studies

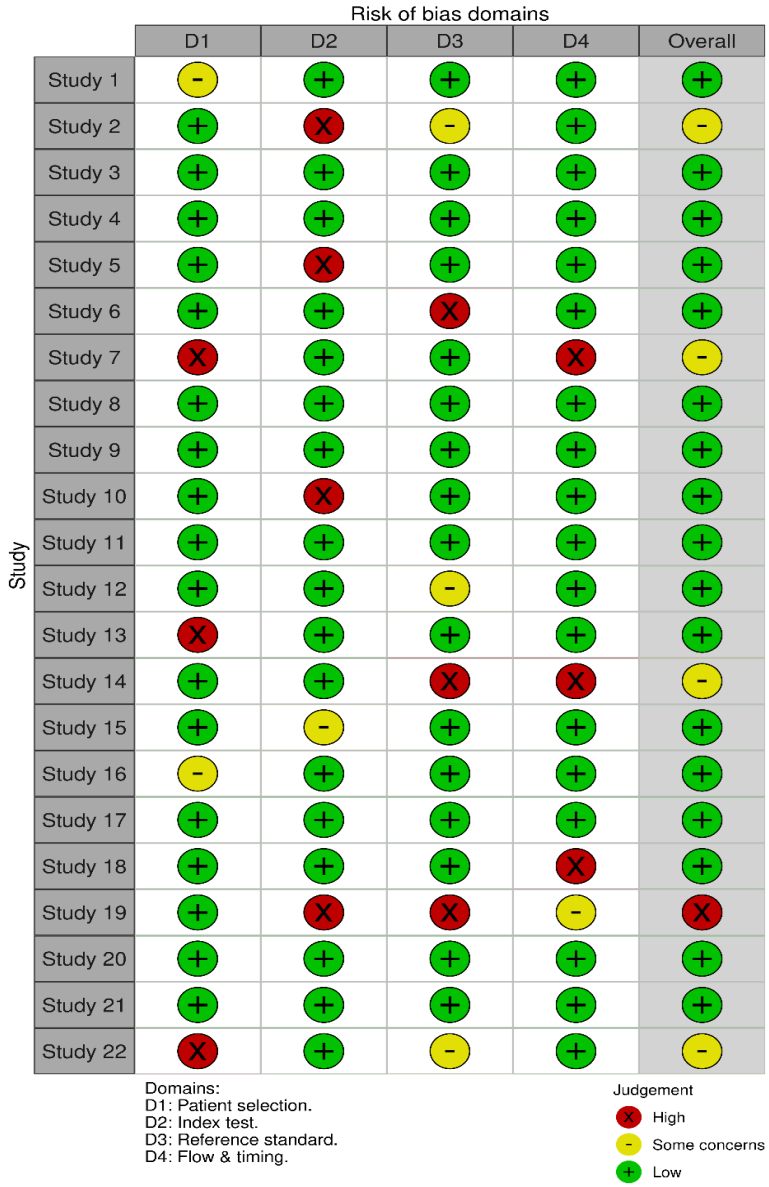

Figure 2: Traffic-light plot of the included studies

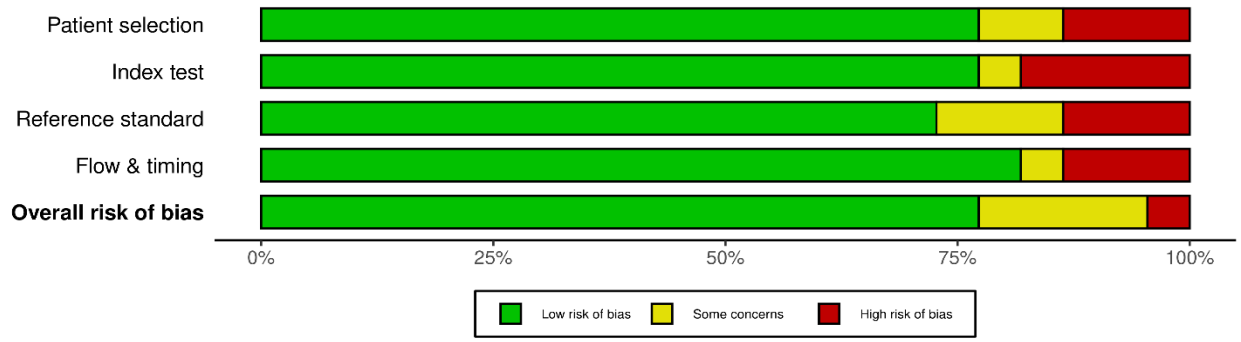

Figure 3. Summary Plot of the Included Studies

Figure 2 and 3 give quality assessment of the studies included. Both figures assess the quality of assessment of the total 22 studies included. The plot had generally depicted a low risk of bias across most of the domains. In the patient selection domain (D1), 17 studies rated were with a low risk of bias, this indicates proper methods for selecting participants, while 3 studies had a high risk. For the index test (D2), 17 studies rated at low risk, although 3 had high risk, indicating some concerns about the implementation of interventions. There were 16 studies at low risk in the reference standard domain (D3), however, 3 expressed some concerns, and 3 at high risk, thus suggesting some potential issue in the evaluation of outcomes. The flow and timing domain (D4) was where the highest number of studies-that were rated with a low risk-are 19, followed by 2 studies that had high risks. Overall, most studies demonstrated low risks of bias, although there were several concerns and high risks in specific domains.

3.5 Demographic Insights and Key Challenges from the Literature

The demographic factors show most challenges in the applications of telemedicine and virtual consultations, especially within the older population. In fact, most studies have demonstrated that there were mostly older people aged between 70 to 80 years has experienced much difficulty in accessing and utilization of virtual clinics and telemedicine (Alsabeeha et al., 2023). A study by Mao et al., (2022) showed that the mean age was 84.6 years, and most of the respondents were females, indicating that gender and age are the major demographic determinants that contribute to telemedicine participation (Mao et al., 2022). Socioeconomic status expressed through the level of education also influenced the comfort levels with virtual platforms. Well-educated individuals used telemedicine quite easily, but those belonging to lower educational groups especially the non-English speaking individuals complained that they were facing a more difficult time. Mao et al., (2022) also showed that 54.6% of the non-English speaking individuals have hard times reaching healthcare providers virtually due to the language problem.

The literature highlights challenges faced by older individuals in telemedicine, including technological barriers, cognitive and sensory impairments, and difficulty learning to navigate virtual systems. They often require technical assistance for virtual consultations, and issues like hearing difficulties further complicate access. Cultural and linguistic factors also contribute to these challenges; as non-English speaking or diverse backgrounds often find telemedicine services difficult to access.

The systematic review also emphasizes the limitations of telemedicine from both the patient and provider viewpoints. While virtual consultations were promptly implemented during the COVID-19 epidemic and found to be mainly acceptable, both patients and providers raised issues about the long-term viability of telemedicine for specific populations (Joughin et al., 2021). Clinicians stated that, while video consultations were typically appropriate for service delivery, they were less popular outside of crisis settings, particularly among older persons who preferred in-person encounters. The findings underline the need of taking demographic differences in technology access and literacy into account when implementing telemedicine, as well as the requirement for user-friendly platforms, technical assistance, and language adjustments.

4. Discussion

4.1 Interpretation of Key Findings

Virtual clinics and telemedicine has become very crucial in the era of COVID-19 as there has been a rapid shift from face-to-face consultations to virtual alternatives. However, such a shift has come with a myriad of challenges, which impact the patient outcomes and satisfaction. From the reviewed 22 studies, technical, operational, and emotional barriers created significant impacts on the patient experiences in different ways.

One of the most significant technological barriers observed was the difficulties patients had in accessing and using telemedicine systems. Older patients older than 70 years find problems in getting acquainted with digital tools and complexity in setting up virtual consultations. A study cited cognitive and sensory impairments as significant barriers. 52.2% of respondents in this study required facilitation in setting up video consultations (Joughin et al., 2021). In addition, lower-educated participants and non-English speaking patients faced more problems, which notably included reliance on the system. It led to frustration and poor satisfaction with telemedicine services. All these technical problems were combined with emotional barriers, including anxiety connected with using technology (Hatami et al., 2022). Those patients who experienced discomfort with virtual consultations were worried about whether the care will be proper and whether they would be able to describe their health issues accurately. This emotional distress was underlined in studies in which patients, although completing virtual consultations, stated a preference for in-person visits in the future, illustrating how psychological responses to telemedicine may hinder its broad adoption (Saad et al., 2021).

Operational barriers were also given prominence in many areas, particularly within rural setups, where the infrastructure of telecommunications was often less reliable. Clinicians and patients in one study by Burton et al., (2022) showed the featuring of rural micro-practices, stated that the clients' irregular internet connections often interrupted consultations, resulting in overstay or incomplete appointments (Burton et al., 2022). This would not only break the circulation of consultations but also result in miscommunication and less patient satisfaction. The prime subjects impacted were generally patients who lack a reliable internet connection in low-income, rural areas because these patients faced more problems in participating in virtual consultations (Ftouni et al., 2022). This limited access to telemedicine increased health disparities, further curtailing their ability to receive timely and effective care.

Moreover, technical and operational barriers have the potential to interfere with the outcomes of patients. Patients who had problems in teleconsultation generally were less satisfied with care provided. Therefore, they lost their trust in the telemedicine system, which negatively affected further patients' follow-up appointments and adherence to treatment plans, mainly of the older complaining about the virtual format in the first place (Sprague & Holschuh, 2019). Although some of the patients, particularly the chronic conditions, appreciated the use of telemedicine, the significant technological challenges revealed that the existing system is not entirely ready to serve every individual equitably.

4.2 Opportunities for Improvement

Given these challenges, the review has identified several areas for improvement. The first area of improvement is the enhancement of telecommunication and infrastructure (Jafarzadeh et al., 2022; Mbunge, Muchemwa, et al., 2022). Most patients throughout rural or underserved areas battled to obtain internet services that were truthful, relating to their needs. Increasing access to reliable and consistent internet connectivity offers a crucial means of achieving fairness in accessing telemedicine. Governments and health systems must make investments in expanding broadband infrastructure, especially in areas that are currently underserved. Additionally, telemedicine systems must be easier to use and more accessible for patients with lower levels of technical proficiency (Mbunge, Muchemwa, et al., 2022). Some of the uncertainty that older individuals and those with low levels of digital literacy experience while utilizing telehealth systems can be reduced with simpler interfaces and more user-friendly designs.

The other key area for improvement is the implementation of digital literacy programs. A number of studies showed that a lack of digital literacy formed part of the most pertinent problems in accessing virtual clinics and telemedicine (Ftouni et al., 2022). Many patients are unfamiliar with technology and have difficulties navigating virtual healthcare systems, and this makes them frustrated and have suboptimal healthcare experiences. The healthcare providers should invest in programs regarding digital literacy, which would educate patients on the effective ways of using telemedicine systems. Such programs would target older adults and the underserved because they are likely to be unfamiliar with digital tools. Technical support and in-person or virtual help desks would also be provided so that patients connect fairly and seamlessly with healthcare providers. From a study by Joughin et al., (2021), it has been established that most older patients prefer assistance in even preparing a virtual consultation, and thus, telemedicine systems should find a way to include such assistance as part of its ordinary services (Joughin et al., 2021).

Another critical improvement area is training health care providers to interact with patients better through virtual consultations (Ftouni et al., 2022). Virtual consultations require a different approach than that during direct consultations. Providers must be trained in communication through virtual platforms to ensure that the message gets across to the patients so that they feel their voices are heard even if the healthcare provider cannot be with them physically. Several studies demonstrated that clinicians perceived video consultations as better than telephone consultations because video helped provide a closer approximation of face-to-face interaction (Gilbert et al., 2020; Joughin et al., 2021). The training programs for the health provider can enhance patient engagement because they will employ more effective strategies for communication and can provide quality virtual care. From literature, it shows the patients who had their questions on diagnosis and further treatment answered by providers during virtual visits responded positively to support the importance of patient-centered communication in telemedicine (Mohammed et al., 2021).

However, integration of virtual clinics with traditional primary care services becomes necessary for the continuation of care. The studies report that even though telemedicine is convenient, in some cases, patients' data and continuity of care were breached because there are not always appropriate linkages into patients' broader information on healthcare. Information can move smoothly between virtual and in-person consultations if telemedicine systems are linked to patients' electronic health records

(EHRs). Thus, with a well-rounded understanding of the patient's health history, healthcare providers will be able to make more informed decisions that will ultimately lead to better outcomes for the patient.

4.3 Comparative Analysis

The review of the 22 studies provides a very rich patient-centered perspective regarding the challenges and opportunities of telemedicine, especially within the context of the COVID-19 pandemic. What makes this review stand out is its focus on the patient's experiences, how demographic factors, such as age, education, and digital literacy, significantly affect access to and satisfaction with telemedicine services. This review contributes to solutions that focus on the needs and preferences of those in vulnerable populations by illustrating technical, operational, and emotional barriers facing patients.

A crucial strength of this review is that it takes a holistic look at the digital divide in healthcare and emphasizes the need to expand digital access and literacy programs so that the underserved should not be left behind in this shift toward virtual care. The review also suggests practical recommendations for improving telemedicine platforms, which should be convenient and accessible to all the other patients. Simultaneously, it argues for more professional training for providers with respect to communication with patients at a distance and stresses the importance of such provider-patient communication in virtual environments, which is often neglected in the context of debates on telemedicine (Battegazzorre et al., 2020).

Lastly, the review offers practical steps to be taken by various levels of healthcare and practice. It assumes some form of quality improvement in infrastructure, programs for digital literacy education, and scaling of telemedicine through integration with conventional care. In this manner, it offers a policy roadmap for virtual care-improving healthcare providers. The insight and recommendations herein add some weight to the ongoing debate on how to make telemedicine more equitable, patient-centered, and effective in the long term.

5. Recommendations

To overcome the challenges of virtual clinics for patient care, a few key recommendations help improve not just access but also the quality of care. First and foremost, there are necessary changes within the infrastructure and policy settings. Investing in telecommunication infrastructural projects, particularly for underserved areas, will help bridge the gap between different socio-economic settings where patients in rural and low-income settings can have access to virtual care more reliably (Mbunge, Batani, et al., 2022). Attempts from policies should also inspire inclusiveness by ensuring that virtual care platforms are accessible and affordable to multiple populations, including aging populations and non-English-speaking individuals.

Hybrid models of care will involve the standardization of virtual and in-person consultation styles (Ramnath et al., 2021). This will provide the patient with flexibility as routine follow-up care can be conducted virtually, while complex and complicated cases require the establishment of a hospital visit. Data-sharing systems ought to be secure and interoperable, which will protect the privacy of the patient and integrate telemedicine into the already existing healthcare records for continuity of care.

Patient-centered strategies should aim at improving the patients' communication, support, and involvement (Gabay et al., 2022). Patient training programs on the improvement of their level of digital literacy, mostly for older people lacking appropriate technological experiences, will then allow them to access virtual care without any problem. On the part of the healthcare providers, strategies to improve virtual bedside manners in order to successfully deliver more trustful communication within the virtual visits are also recommended.

6. Limitations of Reviewed Studies

The reviewed studies have limitations because they focused on high-income countries with digital infrastructure and only examined the context during the COVID-19 pandemic, thereby limiting generalizability to low-income settings or normal healthcare practice. They mostly focus on short-term outcomes but rarely analyze the long-term impacts of virtual clinics on patient care. Sample sizes are often very different; thus, findings may not fully capture the range of challenges that different demographic groups face. Moreover, relying overly on self-reported data, particularly about patient satisfaction and digital literacy, may suffer from bias and restrict the generalizability of the outcome.

7. Conclusion

The systematic review highlights some of the challenges seen with patients and providers in virtual clinics, including technological issues, the digital divide, and demand for improved communication and emotional support in these virtual consultations. Even though virtual clinics give sizeable opportunities for better access to health care, especially in events of a crisis like the COVID-19 pandemic, there are yet so many barriers that need to be addressed and improved to make virtual clinics and telemedicine more effective and equitable. Future research should focus on long-term evaluations about the impact of virtual care on patient outcomes and satisfaction, especially in widely diverse geographical and socio-economic settings. More studies will be required to adequately find virtual-to-face care balance in assisting to develop sustainable hybrid models of care that both support continuity and quality of care.

References

8. Aashima, Nanda, M., & Sharma, R. (2021). A review of patient satisfaction and experience with telemedicine: a virtual solution during and beyond COVID-19 pandemic. *Telemedicine and e-Health*, *27*(12), 1325-1331.
9. Alharbi, K. G., Aldosari, M. N., Alhassan, A. M., Alshallal, K. A., Altamimi, A. M., & Altulaihi, B. A. (2021). Patient satisfaction with virtual clinic during Coronavirus disease (COVID-19) pandemic in primary healthcare, Riyadh, Saudi Arabia. *Journal of Family and Community Medicine*, *28*(1), 48-54.
10. AlJaloud, A. M., Al Suwyed, A., Al Zoman, K. H., Tabbaa, M. Y., Robert, A. A., Al-Nowaiser, A. M., Alotaibi, F., Alfaifi, M. A., & Almubarak, S. A. (2023). Patient Perceptions and Satisfaction With Virtual Clinics During the COVID-19 Pandemic: A Cross-Sectional Study. *Cureus*, *15*(7).
11. Alsabeeha, N. H., Atieh, M. A., & Balakrishnan, M. S. (2023). Older adults' satisfaction with telemedicine during the COVID-19 pandemic: a systematic review. *Telemedicine and e-Health*, *29*(1), 38-49.
12. Battegazzorre, E., Bottino, A., & Lamberti, F. (2020). Training medical communication skills with virtual patients: Literature review and directions for future research. International Conference on Intelligent Technologies for Interactive Entertainment,
13. Bryant, L., Brunner, M., & Hemsley, B. (2020). A review of virtual reality technologies in the field of communication disability: implications for practice and research. *Disability and Rehabilitation: Assistive Technology*, *15*(4), 365-372.
14. Burton, L., Rush, K. L., Smith, M. A., Davis, S., Rodriguez Echeverria, P., Suazo Hidalgo, L., & Görges, M. (2022). Empowering patients through virtual care delivery: qualitative study with micropractice clinic patients and health care providers. *JMIR formative research*, *6*(4), e32528.
15. Connolly, S. L., Gifford, A. L., Miller, C. J., Bauer, M. S., Lehmann, L. S., & Charness, M. E. (2021). Provider perceptions of virtual care during the coronavirus disease 2019 pandemic: a multispecialty survey study. *Medical Care*, *59*(7), 646-652.
16. De Vera, K., Challa, P., Liu, R. H., Fuller, K., Feroz, A. S., Gamble, A., Leung, E., & Seto, E. (2022). Virtual primary care implementation during COVID-19 in high-income countries: a scoping review. *Telemedicine and e-Health*, *28*(7), 920-931.
17. Ftouni, R., AlJardali, B., Hamdanieh, M., Ftouni, L., & Salem, N. (2022). Challenges of telemedicine during the COVID-19 pandemic: a systematic review. *BMC medical informatics and decision making*, *22*(1), 207.
18. Gabay, G., Ornoy, H., & Moskowitz, H. (2022). Patient-centered care in telemedicine–An experimental-design study. *International Journal of Medical Informatics*, *159*, 104672.
19. Gilbert, A. W., Billany, J. C., Adam, R., Martin, L., Tobin, R., Bagdai, S., Galvin, N., Farr, I., Allain, A., & Davies, L. (2020). Rapid implementation of virtual clinics due to COVID-19: report and early evaluation of a quality improvement initiative. *BMJ open quality*, *9*(2), e000985.
20. Grant, P. (2024). The Virtual Clinic. In *The Virtual Hospital* (pp. 39-53). Springer.
21. Gunn, P. J., Marks, J. R., Au, L., Read, S., Waterman, H., Spry, P. G., & Harper, R. A. (2022). Virtual clinics for glaucoma care–Patients' and clinicians' experiences and perceptions: a qualitative evaluation. *Eye*, *36*(1), 209-218.
22. Haleem, A., Javaid, M., Singh, R. P., & Suman, R. (2021). Telemedicine for healthcare: Capabilities, features, barriers, and applications. *Sensors international*, *2*, 100117.
23. Hardcastle, L., & Ogbogu, U. (2020). Virtual care: Enhancing access or harming care? Healthcare management forum,
24. Hatami, H., Deravi, N., Danaei, B., Zangiabadian, M., Shahidi Bonjar, A. H., Kheradmand, A., & Nasiri, M. J. (2022). Telemedicine and improvement of mental health problems in COVID-19 pandemic: A systematic review. *International journal of methods in psychiatric research*, *31*(3), e1924.
25. Jafarzadeh, F., Rahmani, F., Azadmehr, F., Falaki, M., & Nazari, M. (2022). Different applications of telemedicine-assessing the challenges, barriers, and opportunities-a narrative review. *Journal of family medicine and primary care*, *11*(3), 879-886.

26. Joughin, A., Ibitoye, S., Crees, A., Shipway, D., & Braude, P. (2021). Developing a virtual geriatric perioperative medicine clinic: a mixed methods healthcare improvement study. *Age and Ageing*, *50*(4), 1391-1396.
27. Lavin, B., Dormond, C., Scantlebury, M. H., Frouin, P.-Y., & Brodie, M. J. (2020). Bridging the healthcare gap: building the case for epilepsy virtual clinics in the current healthcare environment. *Epilepsy & Behavior*, *111*, 107262.
28. Makhni, M. C., Riew, G. J., & Sumathipala, M. G. (2020). Telemedicine in orthopaedic surgery: challenges and opportunities. *JBJS*, *102*(13), 1109-1115.
29. Mao, A., Tam, L., Xu, A., Osborn, K., Sheffrin, M., Gould, C., Schillinger, E., Martin, M., & Mesias, M. (2022). Barriers to telemedicine video visits for older adults in independent living facilities: mixed methods cross-sectional needs assessment. *JMIR aging*, *5*(2), e34326.
30. Mbunge, E., Batani, J., Gaobotse, G., & Muchemwa, B. (2022). Virtual healthcare services and digital health technologies deployed during coronavirus disease 2019 (COVID-19) pandemic in South Africa: a systematic review. *Global health journal*, *6*(2), 102-113.
31. Mbunge, E., Muchemwa, B., & Batani, J. (2022). Are we there yet? Unbundling the potential adoption and integration of telemedicine to improve virtual healthcare services in African health systems. *Sensors International*, *3*, 100152.
32. Mitchell, K. M., Holtz, B. E., & McCarroll, A. (2019). Patient-centered methods for designing and developing health information communication technologies: a systematic review. *Telemedicine and e-Health*, *25*(11), 1012-1021.
33. Mohammed, H. T., Hyseni, L., Bui, V., Gerritsen, B., Fuller, K., Sung, J., & Alarakhia, M. (2021). Exploring the use and challenges of implementing virtual visits during COVID-19 in primary care and lessons for sustained use. *PloS one*, *16*(6), e0253665.
34. Mold, F., Cooke, D., Ip, A., Roy, P., Denton, S., & Armes, J. (2021). COVID-19 and beyond: virtual consultations in primary care—reflecting on the evidence base for implementation and ensuring reach: commentary article. *BMJ health & care informatics*, *28*(1).
35. Mullick, A. R., Rayhan, N., Koly, K. N., Nahar, K., & Hossain, I. (2020). Telemedicine and Telehealth: a virtual care platform with prospects & importance during COVID-19 outbreak. *Published online*, *8*.
36. Quinn, L. M., Olajide, O., Green, M., Sayed, H., & Ansar, H. (2021). Patient and professional experiences with virtual antenatal clinics during the COVID-19 pandemic in a UK tertiary obstetric hospital: questionnaire study. *Journal of Medical Internet Research*, *23*(8), e25549.
37. Ramnath, V. R., Hill, L., Schultz, J., Mandel, J., Smith, A., Morris, T., Holberg, S., Horton, L. E., Malhotra, A., & Friedman, L. S. (2021). An in-person and telemedicine "hybrid" system to improve cross-border critical care in COVID-19. *Annals of global health*, *87*(1).
38. Rutherford, E., Noray, R., HEarráin, C. Ó., Quinlan, K., Hegarty, A., Ekpotu, L., Arize, C., Fabamwo, F., Alrubaiaan, A., & Bhupalan, A. (2020). Potential benefits and drawbacks of virtual clinics in general surgery: pilot cross-sectional questionnaire study. *JMIR perioperative medicine*, *3*(1), e12491.
39. Saad, M., Chan, S., Nguyen, L., Srivastava, S., & Appireddy, R. (2021). Patient perceptions of the benefits and barriers of virtual postnatal care: a qualitative study. *BMC Pregnancy and Childbirth*, *21*(1), 543.
40. Sprague, S. L., & Holschuh, C. (2019). Telemedicine Versus Clinic Visit: A pilot study of patient satisfaction and recall of diet and exercise recommendations from survivorship care plans. *Clinical Journal of Oncology Nursing*, *23*(6).
41. Vas, V., North, S., Rua, T., Chilton, D., Cashman, M., Malhotra, B., & Garrood, T. (2022). Delivering outpatient virtual clinics during the COVID-19 pandemic: early evaluation of clinicians' experiences. *BMJ open quality*, *11*(1), e001313.
42. Watt, J. A., Fahim, C., Straus, S. E., & Goodarzi, Z. (2022). Barriers and facilitators to virtual care in a geriatric medicine clinic: a semi-structured interview study of patient, caregiver and healthcare provider perspectives. *Age and Ageing*, *51*(1), afab218.
43. Yang, B., Mallett, S., Takwoingi, Y., Davenport, C. F., Hyde, C. J., Whiting, P. F., Deeks, J. J., Leeflang, M. M., & Group†, Q.-C. (2021). QUADAS-C: a tool for assessing risk of bias in comparative diagnostic accuracy studies. *Annals of internal medicine*, *174*(11), 1592-1599.