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Research Paper

Telemedicine-based healthcare management: improving accessibility, diagnosis, and treatment outcomes

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ABSTRACT

Background: Telemedicine has emerged as an integral component of modern healthcare delivery, with its adoption accelerating substantially following healthcare service disruptions during the COVID-19 pandemic. It offers opportunities to improve healthcare accessibility, diagnostic performance, and treatment effectiveness through remote healthcare management.

Objective: To systematically evaluate the impact of telemedicine-based healthcare management on healthcare accessibility, diagnostic accuracy, and treatment effectiveness.

Methods: A systematic literature review was conducted using 23 peer-reviewed publications published between 2007 and 2025. The included studies comprised systematic reviews, cohort studies, scoping reviews, and public health surveillance reports. A narrative synthesis approach was employed using an access–diagnosis–treatment conceptual framework to evaluate the effects of telemedicine across three interrelated healthcare outcome domains.

Results: Telemedicine substantially improved geographical and financial access to healthcare, particularly among rural and underserved populations, with reported increases in access ranging from approximately 40% to 75%. National telehealth consultations increased by up to 154% during peak pandemic weeks in 2020 compared with the corresponding period in the previous year. In image-dependent specialties, particularly dermatology, diagnostic concordance was strongly influenced by image acquisition quality, increasing from 79% for patient-acquired images to 87% for clinician-acquired images. Furthermore, artificial intelligence-assisted remote monitoring tools demonstrated increasing potential for early disease detection and continuous chronic disease management. In telepsychiatry, structured interventions produced clinically meaningful reductions in anxiety and depression symptoms, with reductions exceeding 43% among patients presenting with at

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least moderate baseline symptom severity after eight weeks of treatment.

Conclusion: Telemedicine represents an effective healthcare delivery approach with considerable potential to improve healthcare accessibility, diagnostic performance, and treatment outcomes. However, its effectiveness depends on image quality, appropriate clinical protocols, technological infrastructure, and the integration of artificial intelligence-supported monitoring systems. Further high-quality clinical research is warranted to establish standardized implementation strategies and assess long-term patient outcomes.

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1. INTRODUCTION

Ensuring high-quality, accessible and affordable health care services at the right time and right place has been a constant problem, both in high income and low, and middle-income countries. Households remain underserved, and clinical equity is not achieved in practice, because of long distances to specialist facilities, unequal distribution of the clinical workforce, rising out of pocket costs, and because a small number of population groups are very poorly served. Over the last few decades, the use of information and communication technologies (ICTs), generally called telemedicine, has been suggested as one way of closing these gaps by delivering clinical care from afar, when the patient and provider are not physically present to see one another [1]. The scope of telemedicine now goes beyond a telephone consultation to include the following functionalities: synchronous videoconferencing, store-and-forward video accompanying treatment, mobile health applications for self-management from one session to the next, and remote patient monitoring (RPM) that employs connected sensors [2].

Despite the benefits that telemedicine brings, the implementation has been slow and has been hindered by a number of factors including band width coverage, reimbursement models and clinician lack of knowledge about telemedicine workflows for much of its history. That all changed suddenly in early-2020 with the arrival of the COVID-19 pandemic which compelled health systems across the globe to rapidly move significant portions of ambulatory services online in just a few weeks. From major telehealth providers in the United States, surveillance data showed an increase in visits during the first quarter of 2020, reaching a 50% rise from the same period in 2019, with the largest surge being during one week of surveillance, when in-person visits to emergency departments dropped by 154% [1]. This swift, blanket shift proved not only the pent-up demand for out-of-hospital care, but it also showed the technical viability of scaling it up as well, even after the acute crisis of the pandemic has abated.

However, telemedicine offers a real benefit in enhancing access to healthcare, not only during times of crisis but also in meaningful ways for populations traditionally under-served by the healthcare system. In country low and middle-income settings, reviews focused on reach in the rural setting have reported improvements ranging from around 40% to 75% across a number of reviews, and, at best,

improved patient trust and confidence in remote care (with more varied results) [3]. But these gains in access are just a portion of what telemedicine-based healthcare management offers. Also, is it possible to achieve the same diagnostic accuracy when meeting remotely as in person and does treatment conducted through virtual channels achieve the same or better outcomes as "real-world" treatment? The increasing digitization of the diagnostic process and monitoring of vital parameters in the use of artificial intelligence (AI) tools in communication with patients in telemedicine have renewed interest in the reliability of diagnosis and effectiveness of treatment.

Connected wearable technologies, cheap sensors and data-processing pipelines on the cloud are a parallel development, as is the rise of the internet of things (IoT), that has come into sync with the growth and expansion of telemedicine. Emerging trends like these have created a growing opportunity for the collection of continuous and passive data outside the context of the clinical encounter and imply a change in the nature of telemedicine from episodic virtual visits to continuous, data driven care relationships. The transition has significant implications for the care pathway as a whole: Accessibility, diagnosis, and treatment are not considered to be distinct steps but are viewed as interconnected activities that rely on common technical and organizational resources, particularly when combined with telemedicine. Delivering an effective and sustainable telemedicine program for the long term requires that health-system leaders, clinicians and policymakers understand these interdependencies and the evidence to support these components.

These questions are answered in this paper by reviewing and synthesizing the literature on telemedicine-based health care management, which has been peer-reviewed. The specific aims of the study are: (1) characterization of the evidence regarding the contribution of telemedicine to accessibility of healthcare across geographic, financial, and demographic aspects; (2) examination of diagnostic accuracy and evolving role of AI enabled decision support in representative clinical fields such as dermatology, psychiatry, and point-of-care imaging; (3) synthesis of evidence on treatment outcomes of telemedicine delivered care with special consideration to care for chronic diseases and behavioral health; (4) mapping of existing structural and regulatory barriers preventing broader reach of telemedicine and stepping up its impact on healthcare equity, and proposing an integrated framework for their implementation and future research. The presentation of related work within the four aforementioned domains is followed by Section 3 describing the methodological approach followed in identifying and synthesizing the reviewed literature and is followed by results and discussion points presented with comparative tables and figures detailed in Section 4, followed by implications for policy, practice and future research detailed in Section 5.

2. RELATED WORK

2.1 Telemedicine Effectiveness and Adoption

Previous systematic reviews of the effectiveness of telemedicine gave mixed findings, and indicated that the quality of the evidence available for each specialty and outcome measure was inconsistent [4]. In view of the lack of consistent clinical outcome measures for general practice that can be identified across a variety of clinical telemedicine interventions, a following review protocol was written specifically for general practice with the view of further investigating this issue [5]. Later scoping studies exploring health-service equity considerations in telehealth included forty-two reviews, identified as "persuasive" acceptable, "relatively well understood", dimensions that were "relatively under-studied" such as awareness, digital literacy, readiness of infrastructure, and cost-effectiveness, and reported important gaps in the evidence base for equitable and successful approaches to the expansion of Telehealth [6]. Together, the work highlights that the issue that modern health systems find themselves in today is not whether telemedicine can be clinically effective, but how implementation quality, measurement consistency, and reach for equity can be ensured as telemedicine is scaled up beyond the pilot stage.

2.2 Health Equity, Sustainability, and Patient Experience

The learning from health equity-informed system design indicates that disparities can be re-created digitally by designing health systems with the underserved population group in mind at the design

stage, as opposed to adding new services and tools after implementation [7]. In gastroenterology, guidelines have been suggested on how to implement the use of telemedicine services during the pandemic into long-term and sustainable service lines, which focus specifically on the hybrid mode of care that includes virtual and in-person appointments based on clinical needs [8]. Narrative synthesis of patient satisfaction studies in telehealth consistently reported high satisfaction scores, and indicated that patient acceptance is less of an issue when access and usability conditions are met across specialty areas [9]. In the health system context, a 2025 scoping review of factors that enable the use of telemedicine included top-down initiatives for health system leadership, redesigning clinical workflows, and implementing IT infrastructure that is interoperable across clinical and administrative systems to support telemedicine use beyond patient factors [10]. These findings at the system level offer additional evidence to support the patient-level equity literature and point to the need for conscious investments in both the health system (development of the infrastructure and design of the workflow) and the patient population (access, usability, and measures to foster trust in the program).

2.3 Artificial Intelligence and Remote Patient Monitoring

AI's role in telemedicine and tele-monitoring is said to be a game-changer for enhanced diagnostic accuracy and seamless patient management, boasting AI-aided consultations yielding sensitivities around 88% for respiratory diseases and specificities near 85% in remote diagnosis [11]. Conversely, evaluations of how AI can improve telemedicine highlight those significant concerns such as clinician workload, device and population variations in data [12], and algorithmic bias exist that will need to be addressed to implement at scale. AI tools for remote patient monitoring are especially promising for cost-effective management of chronic diseases in low-resource healthcare systems such as the global burden of cardiovascular diseases, hypertension, and chronic obstructive pulmonary disease (COPD) when they include guidelines for transparency during model development and reporting [13]. Indeed, a systematic review of a wide body of online remote monitoring systems (ORS) for chronic disease management in health systems in Asia reported uniform increases in measures of disease control, with considerable heterogeneity across the studies in the different ways in which patients engaged with the platforms [14]. One thing runs throughout this literature: the best value of AI and remote-monitoring is when you've got a full clinical workflow with defined next steps in place and not in isolation as a standalone technology detached from follow up.

2.4 Diagnostic Accuracy in Specialty Teleconsultation

Dermatology has been used to test the accuracy of telemedicine assessment in general, since it's possible to make the visual assessment in principle with asynchronously transmitted images. Both diagnostic and treatment concordances have been shown to increase as image quality increases and the acne outcome had the most diagnostic agreement across all image types in a randomized cohort study with diagnostic concordance increasing in each consecutive group of image acquisition methods [15]. Complementary pieces of evidence from the evaluation of direct patient to doctor models of Td during the pandemic show that they are quickly being embraced in contexts beyond the emergency phase and reminder that such models are clinically valid if properly accompanied by patient education packages [16]. There is also some low to moderate to substantial level of interobserver agreement in the reliability of teledermatology assessment that spans the entire spectrum of Fitzpatrick skin types, with reliability varying based upon diagnostic category and Fitzpatrick skin tone, and suggesting a need for further methodological refinement [17]. Together, this specific evidence base can lead to a general inference for telediagnostic services in general: the success or failure of this type of service is more likely to be dependent on the decisions made for the type of service (technical implementation) rather than the distance at which the procedure is described (modality).

2.5 Mental Health and Telepsychiatry Outcomes

Because the clinical practice of behavioural health doesn't always require a physical examination, but emphasizes certain verbal and visual assessments, it has become one of the clinical areas most suited

for ongoing behavioural health telemedicine delivery. A large retrospective study of patients receiving only outpatient telepsychiatry showed statistically and clinically significant decreases in anxiety and depression symptom measures following at least 8 weeks of outpatient combined therapy and medication care compared to the largest decrease for patients with only moderate baseline symptom scores [18]. An earlier diagnostic-reliability study in which the telepsychiatry evaluation was compared to in-person evaluation of new outpatient referrals showed that there was good concordance between the two ways of evaluation, supporting the clinical validity of the telepsychiatry evaluation of new outpatient referrals [19]. Building on this work, structured diagnostic instruments with a high level of diagnostic validity were developed for direct use within telepsychiatry and compared with traditional [20], face-to-face diagnostic procedures; studies in emergency department conducted with psychiatric patients requiring acute care showed that good diagnostic validity could be achieved by the use of telepsychiatry in extreme-care settings [21], [20].

2.6 Structural, Regulatory, and Equity-Related Barriers

Despite growing clinical evidence of the effectiveness of telemedicine, a significant body of literature is available, documenting structural barriers that are still hindering the adoption of telemedicine services for equity reasons. Studies focusing on rural telehealth access repeatedly cite inconsistent parity in reimbursement rates; restrictive interstate provider licensure requirements, and unreliable broadband connectivity as those that negatively impact access for rural residents, racial/ethnic minorities, older adults, and those with low education levels [22]. A large sample of federally-funded health centers' public health surveillance data gathered in the second half of 2020 indicates that although the share of telehealth visits is high, it also decreased as in-person visits resumed and was highly variable by health center and region, underscoring the need for continued organizational commitment beyond initial adoption of telemedicine [23]. Altogether, this recent research highlights fairly consistently that, although the clinical and access-related advantages of telemedicine are growing across practice specialties, their implementation in the real world remains heavily reliant on investments in infrastructure and policy alignment, and conscious efforts to ensure appropriate health care access for populations that are likely to fall behind in the digital shift.

3. METHODOLOGY

This study utilizes a structured, narrative review of literature and document-analysis method because it is appropriate for synthesizing heterogeneous literature, comparative clinical outcomes data, and policy relevant outcomes from different health and clinical systems disciplines which could not be easily combined using meta-analytic pooling.

Table 1. Inclusion and Exclusion Criteria for the Literature Review

Criterion	Description
Inclusion publication type	Peer-reviewed systematic/scoping reviews, cohort studies, randomized cohort studies, and official public-health surveillance reports
Inclusion date range	Published between 2007 and 2025
Inclusion topical scope	Telemedicine/telehealth accessibility, diagnostic accuracy, treatment outcomes, remote patient monitoring, AI-enabled care, or structural/equity barriers
Inclusion verifiability	Source carries a verifiable digital object identifier (DOI)
Exclusion	Case reports, opinion pieces, non-peer-reviewed preprints without later publication, and sources without a verifiable DOI

An electronic search of the peer reviewed literature using combinations of the key words ‘telemedicine', ‘telehealth', ‘remote patient monitoring', ‘telepsychiatry', ‘teledermatology', ‘artificial intelligence', ‘healthcare accessibility', ‘diagnostic accuracy', ‘treatment outcomes' and ‘digital divide', was performed, across PubMed/MEDLINE, IEEE Xplore, ScienceDirect (SD) JMIR, Cureus and Google Scholar.

Any record from 2007 to 2025 was eligible, on the heels of both historical and more current studies on the reliability of telemedicine and the latest evidence on the rapidly evolving landscape of AI-driven remote care. Systematic review, scoping review, retrospective or prospective cohort study, randomized cohort study, and an official public-health surveillance report that presents data on surveillance of COVID-19 only were considered eligible sources, whereas the case reports, non-peer-reviewed preprints that did not include a verifiable digital object identifier, and the sources that did not have a digital object identifier were excluded. The inclusion and exclusion criteria that were used in the process of identifying sources are summarized in Table 1.

Twenty-three sources which met these criteria were chosen for full text reading and data extraction. All the sources were categorized based on their contribution to one or more of the 3 outcome domains (accessibility, diagnosis, treatment) consistent with the conceptual framework that showed how patient generated information, communication systems, remote-monitoring infrastructure and AI decision support tools were combined within a telemedicine platform layer that would influence the three outcome pillars and ultimately patient centred health outcomes as shown in Figure 1. The quantitative indicators provided by the sources reviewed (indices of access improvements, diagnostic concordance rates and scores reduction on the symptoms) were analysed and reported in Section 4, comparatively, in order to allow a summary table and figure.

Synthesis was rooted in a narrative approach and involved the identification of themes within each segment of the domains of the outcomes; comparison of findings across domains; and synthesis of findings and their interpretation with reference to identified structural barriers highlighted in the related work review. Like other types of narrative literature reviews, there are some limitations of this methodology such as selective source identification, different study design and outcomes measured across the cited literature and the fact that the associations cited are not necessarily causal. These-restriction will be tackled more in detail in Section 4.5 and recognized in the study's conclusion.

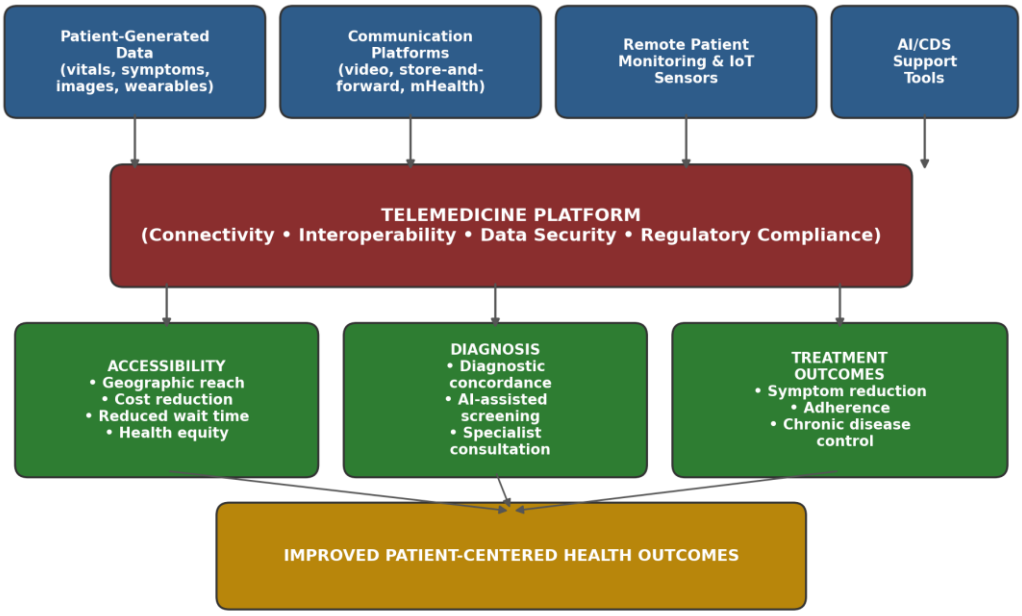


Figure 1. Conceptual Framework Linking Telemedicine Infrastructure to Accessibility, Diagnosis, and Treatment Outcomes

4. RESULTS AND DISCUSSION

The literature synthesis results organized according to the four objectives of this section, as described in Section 1 end in the section with a proposed integrated management pathway.

4.1 Improving Healthcare Accessibility

Reviewed literature consistently yielded large improvements in healthcare accessibility with the implementation of telemedicine, with geographic and/or method of measurement varying the size of the improvements (see Figure 2). The analysed studies included in this review report a variety of varyingly sized improvements attributed to increasing the reach to the rural population, including about 40% to 75% improvement [3]. In a study using national data from the United States health canters, the utilization of telehealth services ranged from about 30% of visits during the peak of the early pandemic response early in 2020, and continued to represent more than one fourth of weekly visits throughout much of the second half of 2020 [1], [23]. During times of the greatest pandemic surges, there was a 50% increase in the number of national visits via telehealth in the first quarter of 2020 compared to national visits via telehealth in the same quarter across 2019, growing to 154% in the one largest surveillance week [1]. Table 2 shows the main service modalities of telemedicine mentioned in the publications surveyed and exemplifying use cases and references for them. But these improvements in access are not equally spread. Past studies suggested that low barriers to infrastructure and real or inequitable use of telemedicine are linked, but they are separate, quantifiable outcomes and are distinct and deserve to be measured separately in implementing future studies (as discussed further in Section 4.4).

Table 2. Comparison of Core Telemedicine Service Modalities

Modality	Description	Representative Use Case / Source
Synchronous video consultation	Real-time audio-video encounter between patient and provider	General and specialty outpatient visits [1], [9]
Store-and-forward	Asynchronous transmission of images or clinical data for later review	Teledermatology diagnosis [15], [16]
Remote patient monitoring	Continuous or periodic transmission of physiological data via connected sensors	Chronic disease management [13], [14]
Mobile health (mHealth)	Smartphone- or app-based self-management and communication tools	Patient engagement and follow-up [2], [10]
AI-enabled decision support	Machine-learning tools embedded in telemedicine workflows for triage or interpretation	Respiratory triage; point-of-care imaging [11], [12]

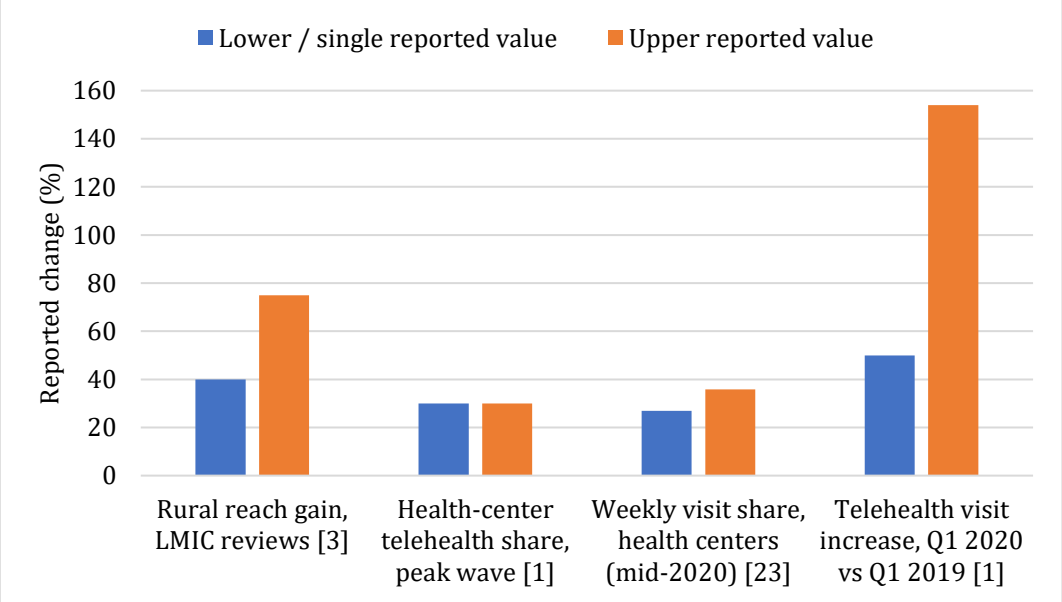


Figure 2. Reported Gains in Healthcare Accessibility Associated with Telemedicine Adoption

4.2 Diagnostic Accuracy and AI-Enabled Decision Support

Telemedicine outcomes are most sensitive to technical choices for diagnostic performance. In Figure 3(a), diagnostic accuracy of the tele - dermatologists and face-to-face evaluators increased as a function of attending image quality ranging from unassisted patient self - captured images, to brief standardized guidance for patient self - captured images to clinical trained staff captured images. As seen in Figure 3(a), diagnostic accuracy (accuracy of dermatologists from face-to-face evaluators) was progressively better at each increment of image quality; from unassisted patient self - captured images, to brief standardized guidance for patient self - captured images, to clinical trained staff captured images. Consistency in treatment (i.e., concordance) also tracked the aforementioned as it increased from 38% to 45% in the three cases of increasing image acquisition quality, and showed a decrease in what needed to be verified using history-taking (decrease as image quality improved) [15]. Moderate to substantial consensus between the different interobserver evaluations showed in complementary research into the assessment of skin lesions using distant images across the entire spectrum of skin coloration, further contributing to the finding that image standardization is the key to good diagnostic outcome in teledermatology, not the fact that the images are being used remotely [16], [17]. Diagnostic concordance information from each specialty in the review are all summarized in Table 3.

Additionally, AI-powered decision support systems are proliferating as part of a telemedicine system to enhance diagnostic capacity beyond dermatology. Outside dermatology, AI decision support tools are now becoming part of the fabric of telemedicine platforms to expand its diagnostic capabilities. It is also reported that AI and telemedicine systems can help triage patients with respiratory symptoms to identify those who could benefit from a face-to-face examination, achieving sensitivities as high as 88% and specificities of around 85% [11], however, the benefits of AI integration into telemedicine must be balanced against continued concerns regarding data variation, algorithmic bias, and the transparency of AI reporting and development [12], [13]. In addition, point-of-care ultrasound augmented by AI-based analysis methods is also emerging as a way to increase the range of diagnosis by non-specialists and perhaps even self-diagnosees during times of restricted face-to-face consultations, expanding the potential utility of AI-enabled remote diagnosis beyond the traditional teleconsultation model.

Likewise, these results suggest that efforts to achieve diagnostic quality assurance in telemedicine programs should prioritize the standardization of variables that contribute to the successful diagnostic process (such as adopting an image-capture protocol, calibrating the sensors, adopting structured intake procedures, etc.), and not assume that the diagnostic process itself is inherently inherent to the modality of telemedicine. Health systems putting money into clinician/patient training on these inputs can expect to see more significant gains in the reliability of their diagnoses, compared to investing only in platform technology.

Table 3. Reported Diagnostic Concordance and Accuracy by Specialty

Specialty	Reported Diagnostic Concordance / Accuracy	Source
Teledermatology (unassisted patient image)	79% concordance with in-person diagnosis	[15]
Teledermatology (assisted patient image)	84% concordance with in-person diagnosis	[15]
Teledermatology (clinically captured image)	87% concordance with in-person diagnosis	[15]
Telepsychiatry (new outpatient referrals)	High concordance with face-to-face assess	[19]
Telepsychiatry (emergency department)	Substantial agreement with in-person assess	[21]
AI-assisted respiratory triage	~88% sensitivity; ~85% specificity	[11]

4.3 Treatment Outcomes in Behavioural Health and Chronic Disease Management

Treatment outcome evidence is most robust during behavioural health clinical assessment, as it is based mostly on verbal and behavioural observations, rather than physical assessment. One large retrospective study of exclusively outpatient telepsychiatry treatment found that patients reported a mean decrease of 6.71 points on the Generalized Anxiety Disorder-7 (GAD-7) and 6.85 points on the Patient Health Questionnaire(ore) of 8 (PHQ-8) scale after 8 weeks of treatment, and after baseline scores of at

least 45% on the GAD-7 and PHQ-8 scales, respectively, were at least moderate (Figure 3(b) left), producing 45.7% and 43.1%point decreases, respectively [18]. Both diagnostic collation studies of new outpatient referrals for face-to-face and tele psychiatric assessment and of emergency room psychiatric patients for urgent psychiatric assessment have noted a general high level of agreement between virtual and on-site assessment, with high face-to-face diagnostic validity of psychiatric care through telemedicine in both scenarios [19], [21].

In chronic-disease settings, there is an increasing volume of systematic review evidence suggesting that internet-based RPM has a positive association with disease-control outcomes across a range of chronic-disease settings; however, systematic review evidence has noted that the effect of RPM was moderated by the design of the internet platform and the strategy that was used to engage with patients [14]. Email interactions on utilizing AI for remote monitoring in low-grade areas also suggest great opportunity for enhancing outcomes in the care of cardiovascular conditions, hypertension, and chronic obstructive pulmonary condition (COPD), when monitoring instruments are used in tandem with effective clinical monitoring systems, and not as a technology-driven solution.

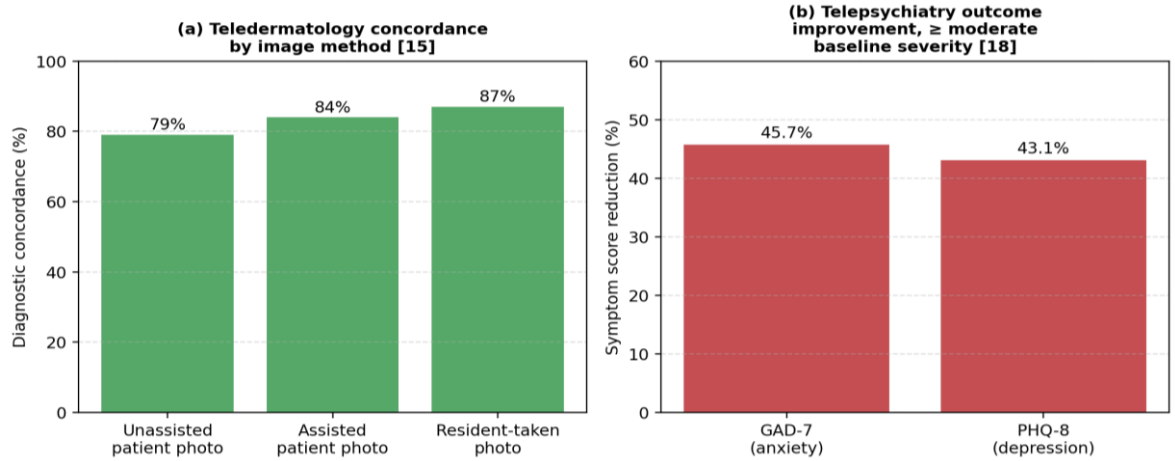


Figure 3. Diagnostic and Treatment Outcome Indicators Reported in Reviewed Telemedicine Studies

4.4 Persistent Barriers and Equity Considerations

Reviewed literature clearly suggests there are a series of common structural barriers that hinder equitable scale up of telemedicine. Where clinical demand for telemedicine visits is strong, rural population, as well as racial and ethnic minorities, older adults and people with reduced education levels have significantly less access to broadband infrastructure and devices necessary to make these visits [22]. The reimbursement policy varies from jurisdiction to jurisdiction and the licensure of a provider across states or even regions of a single state restricts the geographic availability of the individual provider, thus reducing the potential of the specialist teleconsultation providers model [7], [8]. These barriers and mitigation measures together with the key details from the reviewed literature in Table 4.

Table 4. Key Barriers to Telemedicine Adoption and Mitigation Strategies

Barrier	Populations Most Affected	Mitigation Strategies Discussed in the Literature
Inadequate broadband / device access	Rural residents, low-income households, older adults [22]	Broadband infrastructure investment; device-lending programs
Cross-jurisdictional licensure restrictions	Patients in provider-scarce regions [7], [8]	Interstate/cross-border licensure compacts and reciprocity
Inconsistent reimbursement policy	Providers and health systems generally [8], [22]	Reimbursement parity legislation; sustainable payment models
Digital literacy and trust gaps	Older adults, first-time technology users, LMIC populations [3], [6]	Patient education; community health-worker support

Data privacy and security concerns	All patient populations, disproportionately affecting trust among minorities	Standardized security protocols; transparent data-governance policy

4.5 Toward an Integrated Telemedicine Management Framework

Summarizing patient-generated data, communication platforms, remote-monitoring infrastructure, and AI decision-support tools, and placing them in a unified framework, that shared layer of a "telemedicine platform" is where this information, regardless of how it's collected, must be connected, interoperable, secure, and compliant with regulations, for gains across the three accessibility, diagnosis, and treatment-outcome pillars to be realized reliably. In cases where basic connectivity and platform infrastructure are established, evidence presented here indicates progress of accessibility gains can be relatively quick, while gains in diagnosis and treatment outcomes will largely rely on implementation quality, requirements set out by image-acquisition standards, protocol structures, and the integration of AI decision-support tools into platform procedures. Therefore, efforts on a seamless path toward implementation of equitable care management to ensure access to care through telehealth must move at the same time, not one at a time, which is what is discussed further in a concluding section.

5. CONCLUSION

A literature review was conducted sharing findings from peer-reviewed studies over almost two decades, to review the evidence of the impact of telemedicine-based healthcare management within the three intertwined aspects of increased accessibility, increased diagnosis and treatment. Evidence also suggests that telemedicine can help substantially increase access to care in these underserved sub-populations of rural patients and patients with limited resources, with reported gains ranging from about 40% to 75% and national telehealth visit volumes growing by up to 154% during peak demand for telehealth during the pandemic. Image-acquisition quality, and not the modality per se, is proven to have a major impact on diagnostic accuracy across specialty areas that rely heavily on images, such as dermatology, and while most of the aforementioned technology is still in its infancy, AI-based decision-support systems are adding improved diagnostic and monitoring capabilities, specifically in managing respiratory and chronic diseases. Structured telepsychiatry, in the field of behavioural health, has been shown to do just as well as in-person treatment to achieve clinically meaningful reductions in symptom-scores and has a high degree of diagnostic concordance between remote and face-to-face psychiatric assessments even in emergency or acute-care settings. Meanwhile, this review highlights ongoing structural challenges such as hyper segmentation of the reimbursement policy, cross jurisdictional restrictions in licensure, digital literacy disparities, and disparate broadband infrastructure that remain to create uneven access structures for scaling up telemedicine. This disproportionate burden falls on rural populations, racial/ethnic minority groups, older adults, and those living in low- and middle-income countries, suggesting that low-tech solutions can still lead to inequities. Ultimately, the integration proposed in this paper points to the need to regard accessibility, diagnostic accuracy, and treatment effectiveness as mutually dependent and within a shared layer of the telemedicine delivery platform, and to invest in the telemedicine infrastructure alongside clinical protocol standardisation and policy reform, to achieve the full benefits of telemedicine. Moving forward, standardized outcomes reporting in telemedicine research should increase to facilitate more powerful comparative and meta-analyses; longer-term studies of the use of AI-powered remote monitoring devices in a variety of clinical and demographic patients; and infrastructure and policy research focused on how these interventions enable the equitable provision of telemedicine in low-resource settings. Implicit in this review's findings is the need to keep these tectonic and equity dimensions under review, but especially as broader integration of telemedicine becomes a feature of health systems' routine methods of caring for patients in the future.

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Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Dr. Priyadharshini P.	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Informed Consent

All participants were informed about the purpose of the study, and their voluntary consent was obtained prior to data collection.

Ethical Approval

Not Applicable.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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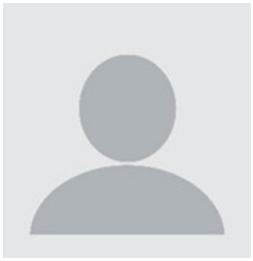
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