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Applications of Artificial Intelligence Models in Teletherapy: A Review of Efficacy and Ethical Implications

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Abstract

This review synthesizes contemporary evidence on the emerging applications of artificial intelligence (AI) models in teletherapy, based on their efficacy and ethical implications. Drawing on 27 peer-reviewed studies published between 2014 and 2025, it integrates diverse perspectives on how AI-enabled systems are increasingly incorporated into mental health care through digital cognitive behavioral therapy (CBT), virtual human (VH) agents, speech recognition platforms, and personalized e-therapy modules. Evidence from clinical studies indicates promising outcomes in patient engagement, symptom reduction, satisfaction, and scalability, particularly in resource-limited settings. Evidence underscores that while AI-assisted teletherapy enhances accessibility, efficiency, and real-time monitoring compared to traditional models, it remains limited in replicating the therapeutic rapport, empathy, and contextual sensitivity that are essential for effective treatment. Key ethical challenges include data privacy concerns, bias, transparency, accountability, and the irreplaceable role of human therapists. The review concludes that the future of teletherapy lies in hybrid care models, substantial data governance, and clinician oversight to ensure safe, effective, and ethically sound integration of AI in mental health practice.

Keywords: AI; ML; NLP; CBT; Teletherapy; Remote Healthcare; I in Healthcare.

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1.Introduction

Artificial intelligence (AI) has emerged as the driving and transformative force within the healthcare sector, particularly in the domain of mental health and teletherapy. Teletherapy, the provision of therapeutic services through digital communication platforms, has become one of the major modes of healthcare delivery in recent years [1]. Although the concept of remote therapy and telemedicine has existed for decades, its integration into mainstream practice accelerated significantly during the COVID-19 pandemic due to restrictions on in-person interactions and the urgent need to maintain continuity of mental health and rehabilitation services [2]. The pandemic crisis exposed the systemic vulnerabilities and limitations in healthcare accessibility, especially in terms of geographical barriers, workforce shortages, and the stigma associated with attending physical clinics [1, 3]. Consequently, teletherapy became a lifeline for patients requiring ongoing care, providing an adaptable, scalable, and safe alternative to traditional face-to-face interventions [4].

Historically, the foundations of teletherapy were laid in the broader field of telemedicine, which began as early as the 1950s through the use of radios and telephones for remote consultations in rural areas. However, advancements in internet technology, mobile applications, and cloud-based platforms have since revolutionized the delivery of therapy. Unlike early forms of telehealth, contemporary teletherapy encompasses real-time video conferencing, asynchronous communication through secure messaging, and even the integration of artificial intelligence (AI) tools for assessment and monitoring [5]. The convergence of these digital innovations with healthcare has allowed for more personalized, flexible, and immediate access to mental health and behavioral interventions.

The COVID-19 pandemic catalyzed an unprecedented shift toward teletherapy. With lockdowns, social distancing policies, and overwhelmed health systems, teletherapy utilization rates soared globally. For instance, in the United States, the proportion of mental health visits conducted via telehealth increased from less than 1% before 2020 to over 40% during the peak of the pandemic [6]. Similarly, countries with previously limited telehealth infrastructure rapidly expanded digital health platforms to accommodate patients' needs. This growth highlighted not only the practicality of teletherapy during crises but also its potential as a sustainable complement to traditional healthcare delivery models.

Contemporarily, accessibility has been one of the most significant drivers of teletherapy's rise. For individuals in remote or underserved areas, where specialist services are scarce, teletherapy bridges geographical divides, enabling timely and equitable care. Additionally, individuals with mobility impairments, chronic illnesses, or caregiving responsibilities benefit from the convenience of receiving therapy at home, reducing the logistical and financial burdens of travel. Teletherapy also offers anonymity and discretion, which can be particularly valuable for individuals hesitant to seek help due to cultural stigma surrounding mental health [3]. Technically, the integration of digital platforms into therapy has fostered innovation in therapeutic methodologies. Tools such as online cognitive-behavioral therapy (CBT) modules, mobile applications for mood tracking, and virtual reality exposure therapies are reshaping how mental health interventions are conceptualized and delivered [7]. These developments not only expand the scope of therapy but also allow practitioners to monitor progress and

tailor interventions more dynamically. The flexibility of hybrid models, where patients can alternate between teletherapy and in-person sessions, reflects an evolving paradigm in patient-centered care. All this modern upgrade credit goes to AI, machine learning (ML), and digitalization.

AI is the propelling force transforming healthcare, as well as offering advanced computational models. These techs are employed for analyzing complex datasets, predicting outcomes, and supporting clinical decision-making. Broadly, AI applications range from diagnostic imaging, drug discovery, and personalized medicine to predictive analytics for patient management. The mental health field, in particular, has begun to adopt AI to address longstanding challenges such as the shortage of mental health professionals, stigma associated with treatment-seeking, and the need for scalable, accessible interventions [8].

In mental health care, AI models have been incorporated into chatbots, virtual therapists, and mobile applications that deliver therapeutic content based on cognitive-behavioral therapy (CBT) and other evidence-based modalities. These AI-driven interventions are deemed to provide real-time support to users, offering monitoring, symptom tracking, and adaptive feedback [9]. Other techs like natural language processing (NLP), a subset of AI, have enabled sentiment analysis and conversational agents that can detect signs of depression, anxiety, or suicidal ideation from text or speech data, thereby assisting clinicians in risk assessment and early intervention [10]. Additionally, ML algorithms can process vast amounts of patient data, including electronic health records, genetic profiles, and behavioral markers, to predict treatment responses and personalize therapeutic approaches [11]. Such predictive models are critical in tailoring interventions to individual needs, improving clinical outcomes, and reducing trial-and-error in mental health care.

Hence, the objectives of this study are to:

i. Review applications of AI in teletherapy
ii. Evaluate the efficacy of AI-driven models
iii. Explore ethical implications and concerns

2.Narrative Review Approach and Methods

This narrative review was conducted to synthesize current evidence on the efficacy and ethical dimensions of artificial intelligence (AI) applications in teletherapy. The review followed the SANRA (Scale for the Assessment of Narrative Review Articles) framework to ensure methodological standards and validity. A total of 27 peer-reviewed articles published between 2014 and 2025 were selected based on relevance, diversity of perspectives, and contribution to the intersection of AI and remote mental health interventions. These sources included scoping reviews, experimental studies, meta-analyses, and conceptual papers drawn from journals ranked Q1-Q2 such as *Health & Social Care in the Community*, *Journal of Telemedicine and Telecare*, *World Psychiatry*, *JMIR mHealth and uHealth*, and *BMC Psychology*.

The literature was identified through a purposive sampling strategy, targeting publications that addressed AI-driven teletherapy tools, ethical concerns surrounding digital mental health, and user perspectives on remote

psychological support. No formal database search protocol was applied, as the goal was to capture a broad conceptual landscape rather than empirical outcomes. Each article was reviewed for its contribution to one or more of the following thematic domains: (1) types of AI applications in teletherapy, (2) clinical efficacy of AI-enhanced teletherapy, (3) ethical and privacy considerations and implications, (3) user engagement and accessibility, and (4) future directions for AI integration in mental health care.

Scientific reasoning was applied to compare findings across studies, highlight methodological strengths and limitations, and identify gaps in current knowledge. Also, referencing was conducted using the IEEE style, and all sources were critically appraised for relevance and credibility.

3.Evaluation of Studies on AI Models in Teletherapy

Ain and Imtiaz [12] examined the role of technology in speech-language therapy (SLT) within resource-limited settings, focusing on perceptions, effectiveness, and challenges. Their study highlighted that technology-enhanced interventions, such as digital platforms and teletherapy tools, significantly improved accessibility and engagement for patients with speech and language disorders. Findings established that both therapists and patients perceived technology as effective in facilitating communication, monitoring progress, and reducing geographical barriers to care. However, the study also identified key challenges, including limited infrastructure, lack of technical expertise, and financial constraints, which hindered large-scale adoption.

Chaturvedi, and his colleagues [13] explored the impact of AI on remote healthcare, focusing on how AI technologies enhance patient engagement, improve connectivity, and address existing barriers in digital health delivery. The study highlighted AI's role in enabling real-time monitoring, predictive analytics, and personalized health interventions, which collectively improve patient adherence and continuity of care. Furthermore, AI-driven chatbots and natural language processing tools were shown to facilitate better patient-provider communication, especially in underserved regions. Despite these benefits, the authors identified challenges such as data privacy concerns, limited digital literacy among patients, and the need for robust infrastructure to support AI applications.

Gkintoni, and his colleagues [14] investigated the evolution of next-generation cognitive-behavioural therapy (CBT) for depression by integrating digital tools, teletherapy platforms, and personalized treatment approaches to optimize mental health outcomes. The study emphasized that digital CBT interventions, when combined with teletherapy, improve accessibility, patient engagement, and adherence to treatment protocols. Personalization through AI-driven assessments and adaptive therapeutic content was found to enhance treatment efficacy by tailoring interventions to individual symptom profiles and progress. Moreover, the incorporation of mobile applications, online self-help modules, and real-time feedback mechanisms strengthened the therapeutic alliance even in remote settings. However, the authors also noted challenges, including privacy concerns, varying levels of digital literacy, and the risk of reduced therapeutic depth compared to traditional in-person sessions.

Ivanitska-Diachun [15] explored the AI in psychotherapeutic practice, focusing on its emerging prospects and challenges. The study highlighted how AI-driven tools, including NLP, chatbots, predictive analytics, and ML

models, can enhance diagnostic accuracy, support personalized therapy, and provide continuous patient monitoring. AI was noted to be particularly effective in identifying early warning signs of mental health deterioration, facilitating real-time interventions, and expanding access to therapy for underserved populations through virtual platforms. Despite these advantages, the paper also emphasized significant challenges such as ethical dilemmas, data privacy, lack of emotional depth in AI interactions, and potential over-reliance on automated systems, which may undermine the therapeutic alliance.

Khadse, and his colleagues [16] examined the transformative role of AI and ML in telemedicine, highlighting their potential to revolutionize remote healthcare delivery. The paper emphasized how AI and ML techniques enhance diagnostic accuracy, predictive modeling, and clinical decision support systems, enabling physicians to provide timely and precise interventions for patients at a distance. Additionally, the integration of these technologies was shown to improve patient monitoring, treatment personalization, and early disease detection, thereby strengthening continuity of care. The authors also validated the importance of real-time data analytics and remote monitoring tools, which optimize resource utilization and reduce healthcare disparities in underserved areas. Despite these advantages, the study acknowledged challenges related to data security, ethical considerations, algorithmic bias, and infrastructure limitations.

Ravesangar, and his colleagues [17] explored the integration of AI in mental health care support within the broader healthcare industry, emphasizing its role in improving diagnosis, treatment, and patient management. Ravesangar and colleagues outlined how AI techniques such as NLP, predictive analytics, and ML models are being leveraged to detect early signs of mental health disorders, personalize therapeutic interventions, and enhance remote monitoring through teletherapy platforms. The authors noted that AI not only improves efficiency and scalability in mental health care delivery but also supports healthcare providers by offering decision-support tools that reduce clinical burden. However, they also highlighted significant challenges, including ethical and legal considerations, data privacy concerns, and the risk of algorithmic bias, which may limit equitable access to AI-driven solutions.

Reference [18] investigated the psychotherapists' attitudes toward the integration of AI in psychotherapy, focusing on perceptions, opportunities, and concerns. The study revealed that while many psychotherapists acknowledged AI's potential to support diagnostics, treatment personalization, and administrative efficiency, there was considerable hesitation regarding its use in direct therapeutic interactions. Key concerns included ethical issues, loss of the human element in therapy, data privacy risks, and the potential overreliance on technology. The authors noted that acceptance of AI was influenced by factors such as therapists' prior exposure to digital tools, age, and theoretical orientation. Interestingly, although AI was not widely perceived as a replacement for therapists, it was considered a valuable complementary tool for enhancing therapy delivery, monitoring patient progress, and extending mental health services to underserved populations.

Yu Wu, and his colleagues [19] presented the development of a bioengineered AI-augmented platform designed for remote mental health interventions. The study integrated AI, bioengineering, and telecommunication technologies to create a system capable of monitoring users' psychological states through multimodal

biosignals, including heart rate variability, brain activity, and behavioral data. The AI-driven platform applied ML algorithms to analyze real-time physiological and cognitive markers, enabling personalized therapeutic recommendations and adaptive interventions. The authors emphasized the platform's potential in enhancing accessibility, reducing clinical burdens, and providing continuous care outside traditional therapeutic settings, particularly for patients in underserved or remote regions. Results demonstrated the system's feasibility in improving early detection of stress, anxiety, and depression, while ensuring timely intervention through digital teletherapy. However, the study also acknowledged challenges such as data privacy, integration with clinical workflows, and the need for regulatory approval before large-scale implementation.

Singh, and his colleagues [20] examined the integration of deep learning (DL) in teletherapy as a means of modernizing mental health support. The study emphasized how DL models can process large volumes of patient speech, text, and behavioral data to identify emotional states, predict mental health risks, and personalize therapeutic interventions. The authors argued that deep learning enhances the precision and adaptability of teletherapy platforms, allowing for more dynamic and individualized treatment compared to traditional digital interventions. Additionally, they highlighted applications such as real-time mood detection, chatbot-based counseling, and predictive monitoring of therapy progress, which significantly improve patient engagement and outcomes. Despite these benefits, the study acknowledged technical and ethical challenges, including the need for transparent AI models, patient data protection, and reducing bias in training datasets.

Kanwal, and his colleagues [21] explored the integration of AI, digital therapeutics, and biomedical electronics in speech-language therapy, emphasizing how these innovations are reshaping clinical practice. The study highlighted the role of AI-driven speech recognition, NLP, and adaptive learning algorithms in personalizing therapy to suit patient-specific needs, thereby enhancing treatment effectiveness. Digital therapeutics and biomedical devices were noted to support real-time monitoring, biofeedback, and remote therapy delivery, which expand accessibility for patients in both clinical and home settings. The authors also discussed the challenges of data privacy, ethical concerns, and the need for adequate infrastructure to support these digital solutions, particularly in resource-limited contexts.

Reference [22] explored the impact and prospects of teletherapy in mental health care, emphasizing its role in expanding access, reducing stigma, and enhancing patient engagement. The study highlighted how teletherapy has bridged geographical and financial barriers, enabling individuals in underserved or rural communities to access timely psychological support. It also validated the integration of digital innovations, including AI-driven tools and secure platforms, which have strengthened personalization and therapeutic effectiveness. He established that teletherapy not only improves continuity of care but also fosters greater patient comfort and flexibility, thereby increasing treatment adherence. However, challenges such as data privacy, digital literacy, and the potential reduction in therapeutic alliance were acknowledged as barriers to optimal outcomes.

Ramzan, and his colleagues [23] investigated the role of AI-driven personalization in e-therapy interventions targeting anxiety, stress, and depression. The study focused on how ML algorithms and NLP can tailor therapeutic content to individual patient needs, thereby enhancing engagement and outcomes. The authors

emphasized that personalization allows e-therapy platforms to adapt in real time to users' emotional states, symptom severity, and therapy progress, providing a more responsive and patient-specific intervention compared to generic digital therapies. Furthermore, the study highlighted both the benefits of scalability and accessibility for underserved populations, as well as challenges related to data privacy, algorithmic bias, and clinical validation.

Benz, and his colleagues [1] conducted a scoping review on the use of teletherapy for allied health interventions in community-based disability services, emphasizing user perspectives. The review found that teletherapy enhanced accessibility to care, particularly for individuals in remote or underserved areas, and provided flexibility for families and caregivers. Users reported positive experiences regarding improved convenience, reduced travel time, and the ability to integrate therapy into daily routines. However, challenges such as technological barriers, limited digital literacy, and concerns over reduced interpersonal connections between therapists and clients were also identified.

Jin, and his colleagues [24] examined the development of telepsychology, outlining its key applications, advantages, and challenges. The study discussed how telepsychology leverages digital platforms, video conferencing, and online assessment tools to provide accessible mental health services, particularly for individuals in remote or underserved regions. Its advantages were identified as improved accessibility, reduced stigma, flexibility in service delivery, and cost-effectiveness, making psychological interventions more widely available. The authors also highlighted challenges such as technological barriers, data security concerns, potential breaches of confidentiality, limited nonverbal cue interpretation, and disparities in digital literacy that may affect therapeutic outcomes.

Loveys, and his colleagues [25] conducted an experimental study comparing the effectiveness of cognitive behavioral stress management (CBSM) delivered through three different modalities: a virtual human, teletherapy, and an e-manual, with a focus on adult women's psychological and physiological outcomes. The study assessed variables such as stress reduction, emotional well-being, and physiological markers, highlighting how digital and virtual interventions could complement traditional therapy. Findings revealed that virtual human-guided CBSM and teletherapy produced more significant improvements in stress management and psychological resilience compared to the e-manual, suggesting that the presence of interactive, responsive systems enhances engagement and outcomes. The integration of AI-driven virtual agents and telehealth platforms demonstrated potential in bridging therapy accessibility gaps, offering scalable and effective mental health interventions. However, the study also noted challenges, including variability in user preferences, engagement levels, and technological accessibility.

Burgoyne and Cohn [26] examined the transition to relational teletherapy during the COVID-19 pandemic, highlighting both opportunities and challenges in adapting family therapy to online platforms. Their findings showed that teletherapy facilitated continuity of care despite lockdown restrictions, allowing families to maintain therapeutic engagement. The study also noted that virtual sessions introduced new relational dynamics, as therapists gained insight into clients' home environments, which sometimes enriched therapeutic processes.

However, issues such as technological disruptions, lack of privacy, and difficulty replicating the intimacy of in-person sessions were reported. The authors emphasized the importance of therapist adaptability, creativity in session structuring, and attention to digital boundaries.

Pravettoni, and his colleagues [27] examined the intersection of cognitive science and telemedicine, highlighting how insights from psychology and AI can transform remote healthcare delivery. The book discusses how cognitive models of decision-making, perception, and patient–provider communication can be integrated into telemedicine systems to enhance patient engagement and adherence. The authors emphasised that AI-driven applications, such as intelligent decision-support systems and adaptive interfaces, can enhance both diagnostic accuracy and personalised treatment planning in tele-oncology and broader healthcare settings. Importantly, the study stressed the need to account for human cognitive limitations and behavioral responses when designing telemedicine technologies, ensuring usability and trust. The findings suggested that the synergy of cognitive psychology and AI not only strengthens clinical effectiveness but also redefines the therapeutic relationship in remote care.

4.Overview of AI Models Used in Teletherapy

4.1 ML and NLP in Mental Health

The integration of machine learning (ML) and natural language processing (NLP) into mental health and teletherapy has gained significant traction in recent years, with applications ranging from diagnosis to therapeutic delivery. A growing body of evidence suggests that these technologies enable more precise and scalable interventions by analyzing patient communication, predicting symptom trajectories, and personalizing care. Based on the study of Ain and Imtiaz, they demonstrated how AI-driven speech recognition and NLP systems can enhance speech-language therapy by detecting irregularities in verbal output and tailoring interventions, particularly in resource-limited settings [12]. Similarly, Kanwal, and his colleagues [21] highlighted the use of NLP to detect articulation errors and monitor linguistic progress, while ML models classified speech impairments and predicted treatment outcomes, thereby improving diagnostic accuracy.

Several studies have emphasized the role of ML and NLP in augmenting psychotherapy and counseling. Chaturvedi, and his colleagues [13] reported that sentiment analysis and predictive models can assess mental health states through speech and text inputs, while Ivanitska-Diachun [15] showed that these tools can also detect cognitive distortions, early signs of crisis, and potential relapse risks. Gkintoni, and his colleagues [14] Specifically, NLP-enabled systems were linked to cognitive behavioral therapy (CBT), demonstrating that depressive thought patterns can be automatically identified, allowing ML algorithms to guide personalized therapy plans. Furthermore, Ramzan, and his colleagues [23] and Nalongo Bina [22] stressed that recommendation systems powered by ML can personalize e-therapy delivery for conditions such as anxiety, stress, and depression, while NLP detects emotional tone and contextual cues in real time.Beyond text-based analysis, AI has been applied to multimodal approaches that fuse language with physiological and behavioral data. Yu Wu, and his colleagues [19] developed an AI-augmented platform that integrates ML, NLP, and

biosignal analysis (e.g., EEG, HRV, and facial recognition) to provide a holistic view of patient states. [20] Similarly, it was shown that deep learning architectures such as CNNs and RNNs can extract behavioral patterns from multimodal data, voice tone, facial expressions, and text, while NLP facilitates emotion recognition and sentiment analysis. Such multimodal systems have been positioned as more robust than text-only systems, given their ability to capture the complexity of human affect.

Despite these advances, challenges regarding adoption and trust remain. Wagner and Schwind [18] noted that although clinicians acknowledge the value of NLP-based chatbots, diagnostic classifiers, and predictive analytics in reducing workload and enhancing monitoring, skepticism persists regarding their capacity to capture the nuances of therapeutic interactions. However, Loveys, and his colleagues [25] demonstrated the feasibility of NLP-driven virtual humans in delivering cognitive behavioral stress management, showing that conversational AI can approximate therapeutic dialogue. Earlier studies during the COVID-19 pandemic (Burgoyne & Cohn; Benz and his colleagues) identified transcription, sentiment analysis, and automated feedback as emerging aids, though their clinical integration was limited at the time [1, 26]. This highlights align with the observations of Jin, and his colleagues [24] who pointed out the growing potential of ML and NLP for automated assessment and precision in telepsychology.

While much of the literature focuses on psychotherapy and counseling, applications also extend into broader domains of healthcare. Ravesangar, and his colleagues [17] demonstrated that predictive analytics and text mining of electronic health records, patient conversations, and wearable sensor data could flag early signs of psychiatric conditions, enabling proactive interventions. Similarly, [27] suggested that AI systems combining ML and cognitive science principles could simulate aspects of human reasoning, support treatment outcome prediction, and facilitate communication in telemedicine contexts. Collectively, these findings underscore how ML and NLP are transforming mental health care by enabling earlier detection, more accurate diagnosis, and personalized teletherapy delivery.

4.2 Types of AI Applications in Teletherapy

AI applications in teletherapy have expanded to include a diverse range of tools that enhance diagnosis, monitoring, and therapeutic delivery. Virtual therapy assistants and chatbots are among the most prominent innovations, providing structured interventions, psychoeducation, and preliminary assessments. Studies have shown that these systems can automate engagement, deliver speech exercises, and support cognitive behavioral therapy (CBT) interventions remotely [12, 13, 22]. By reducing reliance on constant therapist presence, virtual assistants extend the reach of therapeutic services and help mitigate workforce shortages in mental health care Reference [23].

Another critical application is emotion recognition, which leverages speech, facial cues, and physiological data to track patients' affective states during therapy sessions. These systems allow clinicians to monitor frustration, anxiety, or depressive symptoms in real time, enabling dynamic adjustments in therapy delivery [15, 19, 21]. Recent innovations have advanced beyond text-based sentiment analysis by integrating multimodal data such as

electroencephalography (EEG), heart rate variability (HRV), and facial recognition, producing more reliable and holistic insights into patient mental stress [19]. Such multimodal systems represent a growing trend toward bioengineered, adaptive teletherapy platforms that combine affective computing with clinical decision-making.

Session transcription and analysis tools also represent a widely adopted application of AI in teletherapy. Automated transcription supports accurate record-keeping, case documentation, and longitudinal analysis of therapy sessions [12, 24]. Beyond transcription, advanced systems are now capable of identifying cognitive distortions, tracking therapeutic progress, and providing therapists with structured insights into patient communication patterns [14, 18]. This functionality enhances precision in therapeutic planning and reduces the administrative burden on clinicians.AI has also been instrumental in automating CBT delivery. Several studies highlight how AI-driven platforms deliver structured CBT modules, real-time feedback, and personalized interventions outside of live therapy sessions [14, 22, 25]. These digital therapeutics replicate core therapeutic techniques, ensuring that patients can access evidence-based interventions continuously, even when direct therapist support is not available. Automated CBT delivery has shown promise in maintaining therapeutic fidelity while improving scalability in remote care [25].

Finally, crisis detection systems are emerging as a critical application of AI in mental health care. These systems utilize predictive models, text mining, and sentiment analysis to detect early signs of suicidal ideation, relapse risks, or acute emotional distress during or outside therapy sessions [15, 17, 23]. By triggering emergency protocols or notifying clinicians, crisis detection tools enhance patient safety and facilitate timely interventions. Importantly, while psychotherapists recognize the utility of these applications, skepticism persists regarding over-reliance on AI for nuanced therapeutic judgments, reinforcing the view that AI should serve as a complement rather than a replacement for human therapy [18].

4.3 Applications of AI in Teletherapy

The applications of AI in teletherapy can be broadly categorized into “AI-assisted diagnosis and assessment”, “AI-augmented therapeutic interventions”, and “monitoring and feedback systems”. Across these domains, AI serves as both a facilitator and enhancer of mental health care, supporting clinicians while increasing accessibility and personalization for patients.

AI-assisted diagnosis and assessment is one of the most prominent applications, where predictive models and algorithmic evaluation tools are used to analyze patient symptoms, risk factors, and behavioral patterns. Studies show that machine learning (ML) and natural language processing (NLP) can detect speech irregularities, assess depressive markers, and triage patients based on urgency [13, 15, 17]. For instance, AI-driven speech recognition systems in speech-language pathology have been used to identify dysfluencies and classify impairments with high accuracy [16, 21]. Similarly, automated diagnostic tools embedded in teletherapy platforms provide baseline assessments that inform treatment plans, offering scalable solutions for early detection and intervention [20, 24]. These systems not only increase diagnostic precision but also reduce delays in accessing care, especially in underserved settings.

AI-augmented therapeutic interventions represent another transformative domain. Chatbots and virtual therapy assistants deliver structured CBT content, psychoeducation, and supportive dialogue, replicating aspects of therapist-led interventions while maintaining therapeutic fidelity [22, 25]. Several studies highlight adaptive interventions that evolve with patient needs: for example, AI systems can redirect patients showing signs of anxiety toward relaxation modules or provide motivational exercises to those with depressive symptoms [23]. AI has also been applied in gamified speech therapy, where adaptive feedback enhances patient engagement and accelerates progress [21]. By automating routine therapeutic components such as guided relaxation or CBT modules, AI extends the reach of therapy and ensures continuous support beyond live sessions [12, 25].

Monitoring and feedback systems are perhaps the most dynamic aspect of AI in teletherapy, enabling continuous tracking of patient engagement, emotional states, and symptom progression. These systems integrate multimodal data, including speech, facial cues, and physiological signals from wearable sensors, to provide real-time feedback loops to therapists [16, 19]. Automated dashboards analyze session data and generate structured progress reports, reducing administrative burdens while enhancing treatment personalization [1, 13]. Importantly, AI-driven monitoring extends to crisis detection, with predictive models flagging suicidal ideation, relapse risks, or sudden behavioral shifts, thereby enabling timely interventions [17, 18]. These tools enhance safety and continuity of care, particularly in remote or resource-limited contexts.

4.4 Review of Efficacy

4.4.1 Evidence from Clinical Studies

Clinical evidence on AI in teletherapy reveals promising outcomes, particularly in client engagement, symptom reduction, and patient satisfaction, though the maturity of this evidence varies across contexts and methodologies.

Client engagement and adherence are one of the strongest outcomes linked to AI integration. Several studies demonstrate that AI-enabled platforms foster higher engagement by providing continuous support, gamified exercises, and personalized interventions. For instance, digital CBT systems have been shown to improve adherence and engagement compared to conventional CBT, particularly when used as adjuncts to therapist-led sessions [14]. Similarly, AI-supported speech therapy tools that incorporate gamification and adaptive feedback were found to enhance participation and therapy adherence, with patients reporting satisfaction in using interactive exercises [21]. Broader evidence from digital health trials also indicates that AI-enhanced systems reduce waiting times and improve responsiveness, both of which contribute to stronger patient engagement [13].

Symptom reduction has also been validated in clinical settings, although findings are more substantial in certain areas than others. Randomized controlled trials, such as Loveys, and his colleagues [25] demonstrated that AI-driven virtual humans delivering stress management interventions produced significant improvements in both psychological (stress, coping, mood) and physiological (cortisol, immune, autonomic activity) outcomes. These results were comparable to those of human-led teletherapy, suggesting AI's potential for scalability in mental health support. Likewise, AI-enhanced CBT platforms have shown reductions in depressive symptoms

alongside improved treatment adherence [14]. While pilot evidence supports similar benefits in speech-language therapy and broader telemedicine interventions, large-scale controlled trials remain limited [16].Patient and clinician satisfaction with AI-enabled teletherapy presents a nuanced picture. Studies in resource-limited settings report generally positive perceptions, with therapists and patients noting improvements in accessibility, consistency, and efficiency [12]. Patients value personalization features and continuous support, which enhance the sense of being cared for even outside live sessions [13]. At the same time, evidence highlights a generational divide in clinician attitudes: younger, tech-oriented therapists' express openness to AI, while older practitioners remain skeptical, particularly regarding AI's inability to replicate empathy, contextual judgment, and relational dynamics [18]. Practice-based evidence from the COVID-19 pandemic also reflects this balance: clients appreciated the accessibility and safety of digital therapy, though relational depth was sometimes challenged by technological mediation [26].

4.4.2 Comparison with Traditional Teletherapy

Evidence from several studies shows that AI-enhanced teletherapy offers notable advantages over both traditional face-to-face therapy and conventional teletherapy, while also introducing new limitations. Ain and Imtiaz [12] reported that AI-supported interventions significantly reduced waiting times and expanded access to care in underserved regions, though challenges such as weaker therapeutic rapport and digital literacy barriers remained. Similarly, Chaturvedi, and his colleagues [13] highlighted real-time monitoring as a clear advantage of AI systems but cautioned that over-automation may compromise nuanced clinical decision-making in complex cases.

In cognitive-behavioral therapy contexts, Gkintoni, and his colleagues [14] found that AI-enabled CBT delivered greater consistency, scalability, and personalization, yet outcomes were most favorable when AI complemented rather than replaced therapists. Khadse, and his colleagues [16] reinforced this perspective, emphasizing that while AI-enabled telemedicine enhanced efficiency and monitoring, it lacked the contextual sensitivity and emotional intelligence of human clinicians, underscoring the importance of hybrid human-AI models.Studies such as Ravesangar, and his colleagues [17] positioned AI as an on-demand, cost-effective alternative to scheduled teletherapy sessions, offering scalability and constant availability. However, they warned that unbalanced reliance on AI risked depersonalization. Similarly, Wagner and Schwind [18] framed AI as a functional supplement capable of handling data-intensive tasks, but lacking the therapeutic intuition and non-verbal sensitivity essential for deep relational work.Yu Wu, and his colleagues [19] and Ramzan, and his colleagues [23] described AI-personalized therapy as superior in providing dynamic, adaptive interventions and continuous feedback, whereas human-led teletherapy remained constrained by therapist availability and session uniformity. Benz, and his colleagues [1] and Jin, and his colleagues [24] It was noted that while teletherapy improved accessibility, it reduced opportunities for physical observation and subtle interpersonal communication. AI can partially mitigate these gaps through structured monitoring, but it risks oversimplifying complex relational processes.Finally, Loveys, and his colleagues [25] demonstrated that virtual human (VH) agents performed comparably to human teletherapists in stress reduction outcomes, offering scalable and cost-effective delivery. Yet, as Burgoyne and Cohn [26] observed, both AI and teletherapy remain limited in

reproducing non-verbal richness, intimacy, and embodied presence found in in-person psychotherapy.

4.5 Ethical Implications

4.5.1 Privacy and Data Security

One of the most pressing ethical concerns in AI-enabled teletherapy relates to safeguarding sensitive mental health data. Ain and Imtiaz [12] highlighted vulnerabilities in low-resource contexts where weak consent protocols and inadequate cybersecurity infrastructures increase risks of unauthorized access. Similarly, Chaturvedi, and his colleagues [13] warned of unauthorized use and challenges in anonymization, recommending privacy-by-design approaches and adherence to international data protection frameworks. Gkintoni, and his colleagues [14] mentioned these concerns in the context of CBT platforms, calling for stronger encryption and GDPR-aligned processes.

Ivanitska-Diachun [15] and Khadse, and his colleagues [16] emphasized that psychotherapy involves particularly intimate and sensitive data, making breaches especially harmful. Both studies underscored the need for encryption, anonymization, and stricter governance frameworks, with Khadse and his colleagues further advocating blockchain-based solutions and compliance with HIPAA/GDPR [16]. Ravesangar, and his colleagues [17] broadened the discussion to include data from wearables and digital interactions, stressing the importance of robust consent frameworks and ethical AI standards.

Practicing clinicians also shared similar concerns. Wagner and Schwind [18] reported fears that breaches of sensitive session data, such as transcripts or emotional biometrics, would erode patient trust, while Yu Wu, and his colleagues [19] highlighted patient worries about continuous biometric tracking, making informed consent critical. Earlier studies such as Loveys, and his colleagues [25] and Burgoyne and Cohn [26] also warned that breaches during digital interventions and remote sessions could undermine confidentiality. Likewise, Pravettoni, and his colleagues [27] highlighted the high risk of compromise in telemedicine where cognitive, psychological, and medical data converge. Collectively, these findings point to a consensus that without robust encryption, regulatory compliance, and transparent consent processes, AI-driven teletherapy risks eroding patient trust and exacerbating ethical vulnerabilities.

4.5.2 Human Oversight and Accountability

Another central ethical issue concerns responsibility and the irreplaceable role of human therapists. Across studies, there was a strong consensus that AI must function as a supportive tool rather than as a substitute for clinicians. Ain and Imtiaz [12] stressed that a nuanced interpretation of speech and context requires human oversight to prevent harm, while Chaturvedi, and his colleagues [13] emphasized clinician accountability and clear communication about AI's role in therapy. Gkintoni, and his colleagues [14] similarly argued that AI-augmented CBT requires therapist supervision to prevent misclassification and ensure accountability.

Ivanitska-Diachun [15] and Khadse, and his colleagues [16] reinforced this stance, highlighting that ethical

responsibility for misdiagnosis or harm must remain with the human therapist. Khadse, and his colleagues [16] further recommended accountability structures that ensure clinician decision-making in high-risk cases, such as psychiatric crises. Ravesangar, and his colleagues [17] advocated for hybrid care models in which AI supports repetitive or monitoring tasks, while clinicians manage complex, empathy-driven decisions.

Other studies converged on the same conclusion. Benz, and his colleagues [1] and Jin, and his colleagues [24] cautioned that AI should never replace therapists, stressing that accountability and relational depth must remain central to practice. Loveys, and his colleagues [25] acknowledged the therapeutic promise of virtual human (VH) agents but highlighted that clinical oversight remains essential, especially for complex conditions. Burgoyne and Cohn [26] further emphasized that relational subtleties cannot be automated, underscoring the need for transparency and ethical accountability in all AI applications. In alignment, Pravettoni, and his colleagues [27] concluded that while AI can support cognitive processes, it cannot replicate ethical reasoning, empathy, or contextual judgment, which are indispensable to patient safety.

4.6 Discussion

The findings from this review demonstrate that artificial intelligence is steadily reshaping the landscape of teletherapy by enhancing accessibility, personalization, and continuity of mental health care. Across the included studies, a consistent pattern emerges: AI-supported systems ranging from digital CBT modules and NLP-driven conversational agents to speech-language therapy platforms and multimodal biosensing tools offer meaningful improvements in patient engagement, symptom tracking, and real-time intervention. However, these benefits are distributed unevenly across contexts, populations, and technological maturity levels, highlighting the need for careful interpretation.

A key observation is that AI-driven interventions tend to be most effective when used as adjuncts to therapist-led care rather than standalone therapeutic replacements. Studies such as those by Gkintoni and his colleagues and Loveys and his colleagues demonstrate that AI-augmented CBT and virtual human–guided therapies can achieve psychological outcomes comparable to those of conventional teletherapy. These results suggest that AI can maintain therapeutic fidelity while scaling interventions to larger populations. However, evidence from Ain and Imtiaz and others working in low-resource environments indicates that infrastructural constraints and limited digital literacy still hinder widespread adoption. This highlights a technological divide that remains unresolved in many settings.

When comparing previous studies, a clear progression in the field becomes evident. Earlier literature primarily focused on digital therapy and telehealth accessibility, emphasizing convenience and the reduction of geographic barriers. More recent studies, however, move toward precision mental health, where AI models analyze speech features, sentiment, physiological signals, and contextual cues to provide dynamic, patient-specific feedback. This shift from general digital therapy to AI-driven personalization reflects the evolution of AI technologies in mental health applications. Nevertheless, findings are not entirely convergent: while Ramzan and his colleagues and Yu Wu and his colleagues show strong promise in adaptive AI systems, Wagner and

Schwind highlight therapists' persistent concerns regarding empathy, relational depth, and ethical accountability. These differing perspectives underscore that technological capability alone cannot compensate for the nuanced human dimensions of psychotherapy.

The review also reveals significant methodological variation across studies. Some interventions are evaluated through controlled experimental designs, whereas others rely on small samples, pilot studies, or conceptual analyses. This diversity enriches the literature but complicates direct comparison. Furthermore, many studies reporting high efficacy of AI-assisted teletherapy evaluate short-term outcomes, leaving questions about long-term sustainability, emotional safety, and potential dependency on automated systems. As a result, AI's current evidence base offers promising yet preliminary insights that require further empirical strengthening.

Despite these variations, several areas of agreement emerge across prior research. There is a broad consensus that AI improves efficiency, particularly in monitoring, documentation, early risk detection, and delivery of structured therapeutic content. Similarly, most studies affirm that AI increases accessibility for underserved populations, including individuals in rural regions, those with mobility constraints, or communities facing therapist shortages. Ethical concerns also surface consistently, particularly regarding data privacy, algorithmic fairness, informed consent, and responsibility for clinical decisions. These recurring themes align with broader global conversations on trustworthy AI and reflect the need for stronger governance frameworks.

Taken together, the findings suggest that the future of AI-enhanced teletherapy lies in hybrid human AI care models. AI excels in pattern recognition, real-time monitoring, and scalable intervention delivery, while human therapists remain essential for empathy, nuanced interpretation, and ethical decision-making. This complementary dynamic supports a model in which therapists leverage AI insights to enhance diagnostic precision and personalize treatment, rather than viewing AI as a substitute for clinical expertise. The reviewed literature, therefore, positions AI not as a disruptive replacement but as a transformative enhancer of mental health care, one whose success will ultimately depend on ethical design, clinician acceptance, and robust regulatory oversight.

4.7 Limitations of the Study

This narrative review provides a broad and integrative understanding of AI applications in teletherapy; however, a few contextual boundaries should be noted.

First, the review did not use a systematic or database-specific search protocol because the objective was to synthesize conceptual, technological, and empirical perspectives rather than evaluate effect sizes. As a result, the selection of articles was guided by relevance and thematic contribution rather than by exhaustive database coverage.

Second, the reviewed studies vary considerably in methodology, technology maturity, and clinical focus. This diversity enriches the discussion but also means that direct comparison across studies is not always possible.

Third, several AI-driven teletherapy tools discussed in the literature, especially deep learning and multimodal biosensing applications, are still emerging technologies. Their findings are promising yet preliminary, and ongoing research will continue to refine their clinical utility.

Finally, because AI and teletherapy evolve rapidly, the evidence base grows at a pace that outstrips traditional publication cycles. This review, therefore, reflects the most current literature available at the time of search while acknowledging that newer advancements may continue to expand the field.

4.8 Future Directions

Future research and practice should prioritize:

1. **Rigorous clinical trials** – Conducting large-scale randomized controlled trials (RCTs) to validate the efficacy, safety, and long-term outcomes of AI-driven teletherapy compared to traditional interventions.
2. **Ethical and regulatory frameworks** – Developing standardized international guidelines addressing privacy, data ownership, consent, and clinician accountability in AI-augmented mental health care.
3. **Hybrid care models** – Designing systems where AI handles repetitive, monitoring, or scalable tasks while therapists provide empathy-driven, complex decision-making and crisis management.
4. **Personalization and inclusivity** – Enhancing AI adaptability to cultural, linguistic, and individual differences to ensure equitable and personalized mental health support.
5. **Interdisciplinary collaboration** – Encouraging cooperation among clinicians, AI developers, ethicists, and policymakers to balance technological innovation with ethical responsibility.
6. **Transparency and explainability** – Investing in interpretable AI models to build trust among patients and clinicians by making AI-driven decisions more understandable and accountable.

5. Conclusion

Artificial intelligence is reshaping the landscape of teletherapy by enhancing accessibility, management, and efficiency in mental health care. Evidence synthesized across the reviewed literature shows that AI-driven platforms ranging from digital CBT, virtual humans, and speech therapy platforms demonstrate potential in improving client engagement, reducing symptoms, and supporting therapeutic continuity. These advancements hold particular promise for underserved populations and contexts where conventional in-person therapy is limited.However, despite these advantages, AI cannot fully replicate the depth of human empathy, relational dynamics, and contextual judgment that are central to psychotherapy. Ethical concerns, including data privacy, informed consent, clinician accountability, and risks of depersonalization, remain significant barriers to widespread adoption. Hence, it is strongly recommended that AI should be positioned as a supplement rather than a substitute for human therapists. Ultimately, the future of AI in teletherapy lies in hybrid models that integrate the strengths of automated systems with the irreplaceable contributions of clinicians. The synthesis underscores that sustainable progress will depend on embedding human oversight at every level of AI-enabled care and establishing robust governance frameworks aligned with international standards such as HIPAA,

GDPR, and the 2024 EU AI Act.Looking ahead, the future of teletherapy lies in human-AI collaboration where the automated systems handle routine, data-driven, or monitoring tasks, while clinicians can focus on empathy-based and complex decision-making. Advancing this paradigm will require interdisciplinary research, transparent model development, and proper ethical designs that keep patient safety at the core.

References

[1] C. Benz, R. Norman, D. Hendrie, M. Welsh, M. Huntley, and S. Robinson, "Use of Teletherapy for allied health interventions in community-based disability services: A scoping review of user perspectives," *Health & Social Care in the Community*, vol. 30, no. 6, pp. e3934-e3948, 2022, doi: https://doi.org/10.1111/hsc.14105.

[2] A. C. Smith *et al.*, "Telehealth for global emergencies: Implications for coronavirus disease 2019 (COVID-19)," *Journal of telemedicine and telecare*, vol. 26, no. 5, pp. 309-313, 2020.

[3] C. B. Bennett, C. J. Ruggero, A. C. Sever, and L. Yanouri, "eHealth to redress psychotherapy access barriers both new and old: a review of reviews and meta-analyses," *Journal of Psychotherapy Integration*, vol. 30, no. 2, p. 188, 2020.

[4] T. R. Wind, M. Rijkeboer, G. Andersson, and H. Riper, "The COVID-19 pandemic: The 'black swan'for mental health care and a turning point for e-health," *Internet interventions*, vol. 20, p. 100317, 2020.

[5] D. D. Luxton, L. D. Pruitt, and J. E. Osenbach, "Best practices for remote psychological assessment via telehealth technologies," *Professional Psychology: Research and Practice*, vol. 45, no. 1, p. 27, 2014.

[6] L. M. Koonin, "Trends in the use of telehealth during the emergence of the COVID-19 pandemic—United States, January–March 2020," *MMWR. Morbidity and mortality weekly report*, vol. 69, 2020.

[7] G. Andersson, N. Titov, B. F. Dear, A. Rozental, and P. Carlbring, "Internet-delivered psychological treatments: from innovation to implementation," *World Psychiatry*, vol. 18, no. 1, pp. 20-28, 2019.

[8] A. Fiske, P. Henningsen, and A. Buyx, "Your robot therapist will see you now: ethical implications of embodied artificial intelligence in psychiatry, psychology, and psychotherapy," *Journal of medical Internet research*, vol. 21, no. 5, p. e13216, 2019.

[9] B. Inkster, S. Sarda, and V. Subramanian, "An empathy-driven, conversational artificial intelligence agent (Wysa) for digital mental well-being: real-world data evaluation mixed-methods study," *JMIR mHealth and uHealth*, vol. 6, no. 11, p. e12106, 2018.

[10] N. Cummins, S. Scherer, J. Krajewski, S. Schnieder, J. Epps, and T. F. Quatieri, "A review of

depression and suicide risk assessment using speech analysis," *Speech communication,* vol. 71, pp. 10-49, 2015.

[11] A. B. Shatte, D. M. Hutchinson, and S. J. Teague, "Machine learning in mental health: a scoping review of methods and applications," *Psychological medicine,* vol. 49, no. 9, pp. 1426-1448, 2019.

[12] Q. Ain and R. Imtiaz, "The Role of Technology in Speech-Language Therapy: Perceptions, Effectiveness, and Challenges in a Resource-Limited Setting," *Journal of Health and Rehabilitation Research,* vol. 5, no. 1, pp. 1-8, 2025.

[13] U. Chaturvedi, S. B. Chauhan, and I. Singh, "The impact of artificial intelligence on remote healthcare: Enhancing patient engagement, connectivity, and overcoming challenges," *Intelligent Pharmacy,* 2025/01/10/ 2025, doi: https://doi.org/10.1016/j.ipha.2024.12.003.

[14] E. Gkintoni, S. P. Vassilopoulos, and G. Nikolaou, "Next-Generation Cognitive-Behavioral Therapy for Depression: Integrating Digital Tools, Teletherapy, and Personalization for Enhanced Mental Health Outcomes," *Medicina,* vol. 61, no. 3, p. 431, 2025. [Online]. Available: https://www.mdpi.com/1648-9144/61/3/431.

[15] T. Ivanitska-Diachun, "The use of artificial intelligence in psychotherapeutic practice: prospects and challenges," *Collection of scientific papers «ΛΌГОΣ»,* no. February 14, 2025; Boston, USA, pp. 339-347, 2025.

[16] S. Khadse, P. Verma, and V. Lande, "Artificial Intelligence and Machine Learning in Telemedicine: Transforming Remote Healthcare," in *2025 International Conference on Machine Learning and Autonomous Systems (ICMLAS)*, 10-12 March 2025 2025, pp. 508-514, doi: 10.1109/ICMLAS64557.2025.10968984.

[17] K. Ravesangar, T. G. Guan, and B. Singh, "Leveraging Artificial Intelligence in Mental Health Care Support in Healthcare Industries," in *Computational Intelligence in Healthcare Law*: Chapman and Hall/CRC, 2025, pp. 114-127.

[18] J. Wagner and A.-S. Schwind, "Investigating psychotherapists' attitudes towards artificial intelligence in psychotherapy," *BMC Psychology,* vol. 13, no. 1, p. 719, 2025/07/01 2025, doi: 10.1186/s40359-025-03071-7.

[19] J. Yu Wu *et al.*, "Bioengineering an AI-augmented platform for remote mental health interventions," *Results in Engineering,* vol. 27, p. 105931, 2025/09/01/ 2025, doi: https://doi.org/10.1016/j.rineng.2025.105931.

[20] J. Singh, N. A. Shelke, S. Ghosh, A. Nagasri, A. Yadav, and M. Elangovan, "Deep Learning

Integration in Teletherapy for Modernizing Mental Health Support," in *2024 2nd World Conference on Communication & Computing (WCONF)*, 12-14 July 2024 2024, pp. 1-6, doi: 10.1109/WCONF61366.2024.10692232.

[21] K. Kanwal, Z. Ibrahim, and A. A. Siddiqui, "The Convergence of Artificial Intelligence, Digital Therapeutics, and Biomedical Electronics in the field of Speech-Language Therapy: AI and Digital Innovations in Speech Therapy," *Allied Medical Research Journal*, vol. 2, no. 2, pp. 277-292, 2024.

[22] K. Nalongo Bina, "The Impact and Future of Teletherapy in Mental Health Support," 2024.

[23] H. A. Ramzan, F. Abdulah, M. Ahmad, S. Ramzan, and M. Ashraf, "AI-Driven Personalization of E-Therapy Interventions for Anxiety, Stress, and Depression," in *2024 18th International Conference on Open Source Systems and Technologies (ICOSST)*, 26-27 Dec. 2024 2024, pp. 1-6, doi: 10.1109/ICOSST64562.2024.10871158.

[24] Y. Jin, Z. Zhang, P. Zheng, and J. An, "Telepsychology: applications, advantages, and challenges," *Advances in Psychological Science*, vol. 30, no. 1, p. 141, 2022.

[25] K. Loveys, M. Antoni, L. Donkin, M. Sagar, W. Xu, and E. Broadbent, "Effects of Cognitive Behavioral Stress Management Delivered by a Virtual Human, Teletherapy, and an E-Manual on Psychological and Physiological Outcomes in Adult Women: An Experimental Test," *Multimodal Technologies and Interaction*, vol. 6, no. 11, p. 99, 2022. [Online]. Available: https://www.mdpi.com/2414-4088/6/11/99.

[26] N. Burgoyne and A. S. Cohn, "Lessons from the Transition to Relational Teletherapy During COVID-19," *Family Process*, vol. 59, no. 3, pp. 974-988, 2020, doi: https://doi.org/10.1111/famp.12589.

[27] G. Pravettoni, R. Folgieri, and C. Lucchiari, "Cognitive Science in Telemedicine: From Psychology to Artificial Intelligence," in *Tele-oncology*, G. Gatti, G. Pravettoni, and F. Capello Eds. Cham: Springer International Publishing, 2015, pp. 5-22.