

Contributions of Telehealth Applications to Healthcare Services in Türkiye and the International Literature: A Comprehensive Review on Effectiveness, Access, and Cost-Effectiveness

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Abstract

This review study examines the contributions of digital health applications to the healthcare system and their potential for widespread use. A review of existing studies shows that these technologies increase patient access, accelerate service delivery, and improve efficiency in care processes. In addition, digital health tools reduce the workload of healthcare professionals, thereby improving the quality of patient care. When used in conjunction with technological infrastructure and educational support, these applications make significant contributions to the widespread adoption of safe and sustainable healthcare services. The review emphasizes the importance of integrating digital health solutions into modern healthcare systems and strengthening patient-centered services. In conclusion, innovative applications offer important opportunities to increase the effectiveness and accessibility of healthcare services.

Keywords: Digital health interventions, healthcare access, health services delivery, telehealth.

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1. Introduction

Telehealth and telemedicine applications have become an integral part of global healthcare systems, especially during the COVID-19 pandemic. These technologies, which were used to a limited extent before the pandemic, were rapidly adopted with the restriction of physical contact and led to fundamental changes in the delivery of healthcare services (O'Kane, 2022). Research shows that telehealth applications both increase access to healthcare services and improve patient satisfaction, while also highlighting significant issues that still need to be resolved in areas such as data security, digital inequality, and reimbursement policies (Haleem et al., 2021; Kruse et al., 2016).

Telehealth has the capacity to provide seamless, fast, and effective services to patients and healthcare professionals through digital technologies, playing a transformative role in modern healthcare systems. Thanks to electronic health records and remote consultation platforms, telehealth applications improve the performance of healthcare systems in terms of access, service quality, and cost-effectiveness (Ezeamii et al., 2024; Kruse et al., 2016).

The international literature shows that telehealth applications have positive effects, particularly in chronic disease management, mental health, and access to healthcare services in rural areas. These applications have been reported to improve patient outcomes and increase patient satisfaction (Bargeri et al., 2024; Mohsin et al., 2024). In this context, telehealth facilitates the delivery of services by healthcare professionals and contributes to the overall efficiency of healthcare systems by supporting continuity of care.

Studies conducted in Türkiye also present similar findings. Telehealth applications increase access to healthcare, particularly in rural and disadvantaged areas, and improve patient satisfaction (Ak, 2025; Beyan et al., 2025; Sarı, Örsal, & Örsal, 2024). In addition, it has been observed that hospital visits have been optimized and cost-effectiveness in healthcare services has been achieved thanks to mobile applications and remote monitoring systems (Öztomurçuk et al., 2025).

This article aims to comprehensively examine the effectiveness, accessibility, and cost-effectiveness dimensions of telehealth applications by bringing together both Turkish and international literature. The goal of the study is to highlight both the operational and policy dimensions of telehealth applications and to provide a guiding resource for future research.

1.1. The Concept of Telehealth, Global Applications, and Conceptual Framework

According to the World Health Organization, telehealth is defined as a comprehensive system that encompasses the delivery of healthcare services through information and communication technologies, particularly in situations where distance is critical. This system includes the diagnosis, treatment, and prevention of diseases and injuries, as well as health research, assessments, and the continuous education of healthcare professionals to support the health development of both individuals and communities (World Health Organization, 2010). The concept of telehealth encompasses various digital solutions associated with subheadings such as telemedicine, e-health, and mobile health (mHealth). Among these solutions, videoconferencing systems, secure messaging infrastructures, internet-based platforms, and mobile applications are the most common examples. Radiology, dermatology, cardiology, and pathology are among the areas where telehealth applications are heavily used, and the success of these systems is directly related to patient satisfaction and service effectiveness (NEJM, 2018). While telehealth applications in Switzerland began in the 2000s via live video conferencing, during the 2020s, the National Health Service (NHS) in the United Kingdom mandated that healthcare providers strengthen their information technology infrastructure to

promote remote consultations, and telehealth solutions were offered to citizens through private companies (Richardson et al., 2020). In France, while telehealth services before the pandemic only covered certain doctors and patients, by 2020 these restrictions were largely lifted, and telephone consultation was made available. In addition to applications developed specifically for telehealth, communication tools such as Skype, WhatsApp, and FaceTime have also begun to be used in service delivery (Richardson et al., 2020). In countries such as Germany and Sweden, restrictions that existed before COVID-19 have been relaxed, and the scope of remote healthcare services has been expanded. These developments show that telehealth in Europe has evolved from being an application limited to specific conditions to a flexible and accessible healthcare service model (Richardson et al., 2020).

Telemedicine applications have rapidly become widespread in countries such as the United States, the United Kingdom, Spain, Saudi Arabia, Denmark, Singapore, Canada, and the Netherlands, and virtual healthcare services have become a critical tool, especially during the COVID-19 pandemic due to restrictions on physical contact (Padhy et al., 2022; Statista, 2024). Mobile health applications offered within the scope of telehealth provide multifaceted functions such as providing patient care, monitoring vital signs, data transfer, and collecting public health data, thereby increasing service efficiency by integrating with telemedicine, telecare, and e-health systems (Botin et al., 2017). Conceptually, telehealth provides a high-level framework encompassing subheadings such as telemedicine and telecare, and researchers and practitioners are encouraged to use telehealth as a more inclusive term (NEJM, 2018).

E-health applications emerged in Türkiye in the 2000s, and the Turkish Health Information System Action Plan prepared in 2004 defined the strategic objectives for e-health and telehealth applications. The Information Society Strategy Action Plan published in 2006 (2006–2010) included the establishment of telehealth systems among its priority objectives. The Health Transformation Program (2003) encouraged the adoption of telehealth applications as a strategic tool, and the first pilot studies were launched in 2007 in the field of teleradiology (Kaya & Aktaş, 2022). In the following years, tele-ultrasound and tele-radiology systems were integrated into many hospitals, thus ensuring the adaptation of information technologies to clinical services (Ministry of Health of the Republic of Türkiye, 2019). The COVID-19 pandemic triggered the rapid spread of telehealth applications; restrictions on physical contact and the need for uninterrupted access to healthcare services made remote healthcare services a critical solution (O’Kane, 2022). Today, telehealth not only increases the effectiveness of national healthcare services but also plays an important role in Türkiye's international health tourism strategies (Ak, 2025).

During the pandemic, the Ministry of Health launched the “Hayat Eve Sığar (HES)” application, enabling individuals to monitor their risk status, access up-to-date information, and request healthcare services when necessary (Ministry of Health, 2020). In addition, the E-Nabız platform has become an important part of the telehealth infrastructure by offering PCR test result tracking, medication history, and online consultation with family doctors. During the pandemic, many private and public hospitals launched remote examination applications; video conferencing and telephone-based examination methods were preferred, especially in areas that did not require face-to-face intervention, such as psychiatry, dermatology, and family medicine (Köse, 2021). Follow-up forms for COVID-19 patients in home isolation were created through mobile applications, and the monitoring processes for individuals at risk were carried out digitally. A “Psychosocial Support Line” was established to reduce the psychological effects of the pandemic, and psychologists and psychiatrists provided remote counseling services. In addition, tele-monitoring and telephone counseling services were provided by Family Health Centers for individuals with chronic diseases, thereby reducing congestion at health centers and

enabling regular follow-up (Demir & Yıldız, 2021). However, issues such as access inequalities, lack of digital literacy, data security, and inadequate legal infrastructure have emerged in telehealth applications. In particular, the lack of internet infrastructure in rural areas and the difficulty elderly individuals have in using digital systems have limited the inclusiveness of the service (Akgün et al., 2021).

1.2. The Global Development of Telemedicine Applications and the Impact of the Pandemic

Telemedicine systems are attracting attention as an important area showing rapid growth in the healthcare services market worldwide. For example, it is reported that the telemedicine market in the UK was worth approximately \$481 million in 2018 and is expected to reach \$1.241 billion by 2027 (Statista, 2024). In Canada, the government invested \$240.5 million in May 2020 to develop telemedicine applications during the COVID-19 pandemic (Government of Canada, 2020). Globally, a market report published in 2018 predicted that the telemedicine sector would reach \$38.28 billion in 2020, while the actual figures were recorded as \$61.40 billion in 2019 and \$79.79 billion in 2020 due to the impact of the pandemic current forecasts predict that the global telehealth market will reach approximately \$396.76 billion by 2027 (Globe Newswire, 2020). These figures show that the COVID-19 pandemic has accelerated the adoption of telehealth services and that these systems will remain a fundamental component of healthcare not only during times of crisis but also after the pandemic. Global trends indicate that investments in telehealth solutions and strengthening infrastructure are critical to improving the accessibility, effectiveness, and sustainability of healthcare services.

1.3. The Effectiveness of Telehealth and Patient Outcomes

Numerous systematic reviews conducted in recent years have shown that telehealth applications can be as effective as in-person care in many clinical areas and offer certain advantages in some cases. Doraiswamy, Abraham, Mamtani, and Cheema (2020) emphasized that telehealth was effective in managing chronic diseases during the pandemic, particularly increasing patient engagement in diabetes and hypertension monitoring. Among the 543 included articles, 461 (84.9%) reported positive outcomes, indicating the general effectiveness of telehealth in maintaining healthcare delivery during this period. Telehealth was applied across multiple clinical domains, supporting multifaceted clinical care and patient monitoring. Additionally, 39 different definitions were identified, reflecting the rapid expansion of telehealth applications. The integration of remote monitoring tools, such as wearable devices, glucometers, and blood pressure monitors, further enhanced its effectiveness. These findings provide concrete evidence that telehealth served as a sustainable and effective model for healthcare delivery during the pandemic. Similarly, Garfan and colleagues (2021) reported that telehealth applications supported continuity of care and reduced hospital crowding without negatively affecting patient outcomes. In the field of mental health, telehealth has provided high satisfaction and treatment adherence, particularly in online counseling and psychotherapy services (Ezeamii et al., 2024). Haleem, Javaid, Khan, and Suman (2021) noted in their report that telehealth systems, when implemented correctly, can reduce clinical errors and do not compromise patient safety. However, these positive effects require well-structured infrastructure and trained personnel; in resource-constrained areas where these conditions cannot be met, the effectiveness of telehealth may be limited (Agbeyangi et al., 2025). Various systematic reviews have shown that telehealth applications can improve clinical indicators and increase patient participation in the management of chronic diseases such as diabetes (Ezeamii et al., 2024). Anawade and colleagues' (2023) study shows that telehealth increases access to healthcare services, reduces costs, and contributes to health equity. O'Kane (2022) reports that telehealth use was limited before the pandemic but experienced rapid growth during the pandemic due to regulatory flexibility and changes in reimbursement models.

However, telehealth cannot completely replace face-to-face care in some clinical scenarios and patient groups. Telehealth may be limited, especially in complex, multidisciplinary cases that require physical examination (Haleem et al., 2021). A study conducted in Türkiye examined the feasibility of telehealth applications among family medicine residents and the impact of socio-demographic factors; it revealed reservations about telehealth among physicians with less professional experience (Erbayraktar et al., 2022).

Numerous studies have shown that telehealth applications increase access to healthcare in rural areas and improve patient satisfaction (Ezeamii et al., 2024). For instance, a review reported that telehealth interventions were associated with a 30–50 % reduction in waiting times and a 20–40 % increase in appointment adherence, enabling patients to receive care more promptly (Farooq, 2025). Moreover, across diverse clinical settings, 70–95 % of telehealth users reported satisfaction with the services, indicating high acceptability of remote healthcare. From an economic perspective, telehealth usage has been shown to reduce travel expenses by 25–60 %, thereby mitigating financial and logistical barriers and facilitating access. Another analysis revealed that telehealth implementation increased clinical encounters in rural areas by 25–40 %, meaning that more patients who might otherwise have delayed or forgone treatment were able to access care. Collectively, these quantitative findings provide robust evidence that telehealth applications improve healthcare access, enhance appointment adherence, increase patient satisfaction, and reduce costs (Blessing et al., 2025; Farooq, 2025; Selvaraj, 2024). Prada et al. (2024), in a cross-sectional study conducted in Latin America, reported that telemedicine significantly reduced travel time, distance, and associated costs, improving accessibility across cardiology, dermatology, mental health, and primary care services. Similarly, Mohanna et al. (2024) examined teletherapy services for cancer center patients and found that 54.1 % of participants utilized the service, with 84.4 % reporting it as convenient and effective, indicating that telehealth maintains continuity of care while reducing stigma and expanding access in mental health services. Aledia et al. (2024) analyzed 1,543 e-consultations for hospitalized patients and found that 53.5 % of requests were resolved electronically, with an average response time of 3.7 hours compared to 7.3 hours for in-person consultations, demonstrating efficiency gains and improved access. Additionally, e-pharmacy evaluations showed reductions in A1c levels in patients with diabetes, highlighting telehealth's efficacy in chronic disease management. A prospective observational study of 186 participants further reported significant improvements in patient health, cost savings, satisfaction, and accessibility. McGinley et al. (2024) examined telehealth in multiple sclerosis management over 24 months and confirmed that remote care maintained clinical outcomes while improving patient experience, treatment adherence, and healthcare access. Collectively, these studies provide robust quantitative and qualitative evidence that telehealth interventions are effective, economically beneficial, and capable of improving patient outcomes and healthcare delivery efficiency across diverse clinical settings. Telemedicine stands out as an effective tool in chronic disease management and monitoring processes; it significantly reduces waiting times in outpatient clinics and increases efficiency in healthcare services by minimizing the need for physical examinations through remote appointment/follow-up applications. Telehealth also saves costs, facilitates patient follow-up, and contributes to reducing inequalities in healthcare services. Remote diagnosis applications, particularly in radiology and dermatology, increase the accuracy of diagnosis, reduce the risk of misdiagnosis, and increase patient satisfaction (Mohsin et al., 2024). In musculoskeletal disorders, telehealth is as effective as face-to-face care in exercise guidance and follow-up processes, providing significant improvements in patients' pain and function scores (Barger et al., 2024). In endocrinology, telehealth has yielded successful results in the follow-up of diabetes and thyroid patients, with observed decreases in HbA1c levels and increases in treatment adherence rates (Seyed Alinaghi et al., 2024).

Effective communication processes in telehealth have been found to directly affect patient satisfaction and improve clinical outcomes. In this context, it is important to develop the digital communication skills of healthcare personnel.

1.4. Access, Digital Equality, and User Satisfaction

Telehealth has great potential in terms of overcoming geographical barriers, increasing access to healthcare services, and providing flexibility in service delivery. Studies conducted in Türkiye show that the legal framework for the Remote Healthcare Services (RHSD) model, which came into effect in 2022, could increase access to services (Arı, 2024). However, the digital divide remains a significant barrier worldwide; older individuals, low-income people, and those living in rural areas are disadvantaged in terms of internet and device access and digital literacy (Kruse et al., 2016). The Turkish literature reports that telehealth has increased access to services, particularly through video consultations, remote monitoring, and mobile applications, but emphasizes that access difficulties remain for groups with limited digital literacy (Birinci, 2021). In Türkiye, a statistically significant increase ($p < .001$) in the use of telemedicine by oncologists was observed due to the pandemic, indicating the widespread clinical use of telehealth services (Sahin et al., 2021). Over 400 million radiological images and approximately 200 million reports were made remotely accessible through telehealth infrastructures, teleradiology, and e-Nabız systems, enabling patients, particularly those in rural and hard-to-reach areas, to access specialist evaluations more easily (SD Platform, 2023). Economically, the Turkish telehealth market reached approximately USD 4.3 billion in 2023, demonstrating the growing demand and widespread adoption of digital health solutions (Ken Research, 2023). These data concretely demonstrate, through quantitative measurements, that telehealth applications increase access, improve appointment compliance, enhance patient satisfaction, and reduce costs. In one study, it was found that among women aged 20–60, 48.8 % had inadequate health literacy and 26.2 % had limited/moderate levels, while only 19.8 % demonstrated sufficient health literacy, indicating a limited capacity to acquire digital health information and effectively use digital platforms, despite relatively high rates of accessing health information online (Demir et al., 2024). Moreover, internet penetration in rural areas of Türkiye is substantially lower compared to urban centers: approximately 28 % of the rural population lacks reliable internet access, and internet access rates are 57 % in rural areas versus 94 % in urban areas, which significantly restricts access to online services such as telehealth (Research And Markets, 2023).

International studies also present similar findings. Although telehealth applications have the potential to increase access, they can deepen the digital divide risk when proper planning and infrastructure are not provided (Kruse et al., 2016; Özen et al., 2024). This situation demonstrates that technological, socioeconomic, and geographic factors play a critical role in the equitable distribution of access advantages. System-level organization, infrastructure, and policy support are necessary to ensure successful telehealth applications; health systems must be strengthened both technically and administratively (Lee & Johnson, 2025).

Telehealth users generally express satisfaction with the service, with advantages such as time savings and ease of access being particularly prominent (Garfan et al., 2021; Doraiswamy et al., 2020). However, older individuals or those with limited digital skills may be unable to use the service effectively due to technical issues. These findings reveal that telehealth has the potential to reduce access inequalities, but it can also create new types of digital inequalities (Nourani et al., 2025).

Studies measuring user experience and satisfaction with telehealth applications in Türkiye are also available. Özden et al. (2021) and Özkeskin et al. (2022) confirmed the validity and

reliability of the TUQ and TSQ scales, demonstrating that telehealth user satisfaction is measurable and high. In Türkiye, telehealth user satisfaction and utility among multiple sclerosis (MS) patients were psychometrically evaluated using the Telehealth Satisfaction and Utility Questionnaire (TSUQ) and the Telehealth Patient Questionnaire (TPQ), both adapted into Turkish ($n = 149$; mean age 40.9 ± 10.9 years; mean MS duration 9.15 ± 6.24 years). Internal consistency was excellent for both instruments (TSUQ $\alpha = 0.971-0.974$; TPQ $\alpha = 0.878-0.890$), and test-retest reliability was high (ICC > 0.80). A strong correlation was observed between the total scores of TSUQ and TPQ ($r = 0.734$, $p < 0.01$). Additionally, correlations with the Beck Depression Scale were moderate for TSUQ ($r = -0.363$, $p < 0.01$) and low for TPQ ($r = -0.217$, $p < 0.05$). These findings indicate that telehealth user satisfaction can be reliably and validly measured in Turkish, and that long-term telehealth use among MS patients is associated with high levels of both satisfaction and usability. Mutlu et al. (2024) found that participants' knowledge and attitudes toward telehealth use were positive using the AKAS scale. The study population consisted of 425 participants, including 225 (52.9 %) women and 200 (47.1 %) men, with ages ranging from 18 to 56 years (mean age 24.2 ± 5.6 years). Of the sample, 78.1 % ($n = 332$) were medical students at Eskişehir Osmangazi University, and 21.9 % ($n = 93$) were medical residents. The study found that participants with advanced computer and internet skills had significantly higher telemedicine awareness compared to those with beginner or intermediate skills. The “AKAS of Telemedicine” questionnaire, consisting of 47 items, was used to assess telemedicine awareness, knowledge, attitudes, and skills, and comprises four subscales: Telemedicine Awareness (12 items), Telemedicine Knowledge (11 items), Attitudes toward Telemedicine (11 items), and Telemedicine Skills (13 items). Analyses revealed moderate positive correlations between awareness and attitudes, awareness and skills, and knowledge and attitudes. Additionally, weak positive correlations were observed between awareness and knowledge, and between attitudes and skills, indicating interrelationships among subdomains. These results demonstrate that the Turkish version of the AKAS questionnaire is a reliable and valid instrument for measuring telemedicine competencies among physicians. Furthermore, the study concluded that educational and training programs tailored according to AKAS levels could be effective in enhancing physicians' telemedicine competencies, reducing healthcare workers' workload, and facilitating patients' access to healthcare services. Therefore, the AKAS questionnaire is considered a valuable tool for assessing telemedicine awareness, knowledge, attitudes, and skills among healthcare professionals in Türkiye.

Another study indicated that telehealth services could increase accessibility, effectiveness, and efficiency, particularly for older adults and people with chronic diseases. Video conferencing, visits and assessments are conducted, and the use of Bluetooth-connected devices such as cardiac monitors and glucose monitors to view images has proven this type of remote care to be very effective. For example, in the UK, cases of diabetes, heart disease and chronic lung disease that were monitored remotely saw a 50% reduction in the one-year mortality rate and an 18% reduction in average hospitalizations (Tekin Kaya, 2022).

Telehealth provides cost-effective and accessible healthcare by reducing physical barriers; the intention to adopt it among healthcare professionals is high, and perceived benefits and attitudes shape this intention (Ağaoğlu et al., 2024; Birinci, 2021; Çam & Kaçmaz, 2018). The pandemic and its aftermath have demonstrated the value of telehealth not only during times of crisis but also as a permanent and strategic component of healthcare services.

1.5. Economic Impacts and Sustainability

Research on the cost-effectiveness of telehealth presents complex and sometimes conflicting results. O'Kane (2022) and Ezeamii et al. (2024) report that telehealth applications reduce costs

in the short term, providing economic advantages, particularly through savings in patient transportation and waiting times. An economic evaluation of providing neonatal consultations via telemedicine to rural hospitals estimated a total savings of \$22.12 per live birth, while the operational cost of telemedicine was \$6.34, resulting in a net savings of approximately \$2.49 per \$1 invested. This corresponds to a positive return on investment (ROI) of 3.49 for telehealth interventions (Yoo et al., 2025). In a urology clinic, 6,444 patients were seen via telehealth over a six-month period. Patients traveled an average of 69 ± 148 miles roundtrip for appointments. Including gasoline costs and time away from work, the average cost savings per patient was $\$152.78 \pm 105.90$, resulting in a total savings of \$984,534.73 over six months. Additionally, the reduction in travel resulted in a significant environmental impact, preventing 153.36 metric tons of CO₂ emissions (Wong et al., 2025). Another economic evaluation analyzed 25,496 telehealth visits, demonstrating average savings of \$147.4–\$186.1 per visit in travel and time costs. For new or initial visits, savings per patient ranged from \$176.6–\$222.8, and for follow-up visits from \$141.1–\$178.1, indicating that telehealth provides substantial economic advantages by reducing travel and time-related costs (Patel et al., 2023).

In studies on geriatric telehealth, some reports indicate that telehealth interventions reduced out-of-pocket expenses by up to 94 %, particularly in older populations, significantly lowering direct costs. Intervention costs per event ranged from \$223–\$3,846, with overall patient satisfaction generally high and comparable to in-person care. However, adults aged 80 and over faced greater barriers due to challenges in digital literacy and usability (Chandak et al., 2025). A review of 55 studies evaluating telehealth cost-effectiveness collectively found that telehealth generally reduced patient costs and offered economic benefits compared to conventional care. For instance, during the COVID-19 pandemic, telehealth interventions were associated with increased telehealth spending and decreased patient healthcare costs, which mitigated monthly total healthcare expenditure fluctuations (Lavin et al., 2025). On the other hand, long-term cost-effectiveness analyses yield more heterogeneous results. Haleem et al. (2021) emphasized that telehealth systems require significant initial investments and that software, hardware, and staff training costs must be taken into account. Doraiswamy and colleagues (2020) noted that reimbursement policies play a critical role in terms of sustainability. In Türkiye, according to the communiqué published in the Official Gazette, "Healthcare services for remote patient assessment" can now be billed/reimbursed by the Social Security Institution (SGK) under the transaction code "520032 Healthcare services for remote patient assessment" in Annex 2/B of the Health Application Communiqué (SUT) (SGK, 2024). Reimbursement mechanisms temporarily implemented in many countries during the pandemic accelerated the use of telehealth, but the sustainability of the service may be at risk if these regulations are not made permanent (Agbeyangi et al., 2025). On the other hand, some systematic reviews have shown that telehealth applications reduce care costs and yield positive results in terms of cost-benefit (Sarı, Örsal & Örsal, 2024). These findings suggest that the adoption of cost-effective technologies may support the sustainability of healthcare systems.

In terms of effectiveness, telehealth has yielded successful results in many areas, such as chronic disease management, monitoring services, and mental health support. Studies conducted in Türkiye, focusing on e-health literacy and user experience, have shown that these applications can increase the surface of interaction with patients (Özden et al., 2021).

1.6. Application Barriers and Ethical Issues

Kruse and colleagues (2016) identify the key factors hindering the widespread adoption of telehealth as lack of technical infrastructure, data security concerns, regulatory uncertainties, and resistance from healthcare professionals. Haleem and colleagues (2021) note that there are still shortcomings in adapting data privacy and patient consent processes to the digital

environment. Doraiswamy and colleagues (2020) emphasize that the legal framework for telehealth services has not yet been clarified in many countries and that the issue of responsibility sharing, particularly in cross-border healthcare, creates gray areas. This situation necessitates the development of international standards and effective cooperation between regulatory agencies (Nourani et al., 2025).

Technical infrastructure deficiencies, insufficient digital literacy among healthcare personnel, integration of organizational processes, data security, and patient safety risks are prominent obstacles to the successful implementation of telehealth systems (Haleem et al., 2021). In particular, data privacy, lack of security protocols, and an unclear regulatory framework can negatively impact user trust.

2. Conclusions and Recommendations

The current literature shows that telehealth applications play an important role in increasing access to healthcare services, ensuring service continuity, and improving patient satisfaction. Especially in rural and hard-to-reach areas, telehealth fills gaps in healthcare access, facilitates patient follow-up processes, and supports treatment continuity (Statista, 2024). The COVID-19 pandemic has revealed that telehealth systems are not just a temporary solution in times of crisis but can be a permanent and strategic component of modern healthcare systems. In the case of Türkiye, the HES and e-Nabız platforms have provided citizens with access to their health data and enabled the effective implementation of remote consultation processes (Ministry of Health, 2020; Yılmaz, Kaya & Arslan, 2021). Similarly, in countries such as the US, UK, Canada, and Sweden, telehealth applications have optimized the workload for both patients and healthcare professionals by ensuring the continuity of healthcare services, particularly in primary care, psychiatry, dermatology, and radiology (Statista, 2024). However, the literature emphasizes that there are still some limitations to telehealth. Digital literacy gaps, infrastructure deficiencies, data security risks, and sustainable financing issues limit access and service quality, particularly for older individuals and those living in rural areas (Akgün et al., 2021; O'Kane, 2022). Furthermore, the effectiveness of telehealth is largely related to user education, the digital skills of healthcare professionals, and the nature of legal regulations (Doraiswamy et al., 2020; Kruse et al., 2016). In this context, telehealth services appear to play a complementary and supportive role rather than completely replacing traditional healthcare services.

Current findings highlight the need for a strategic and holistic approach for telehealth to be sustainable and effective. First, strengthening the technological infrastructure and expanding digital access are critical for the seamless and secure delivery of telehealth services in both rural and urban areas. In this regard, high-speed internet access, improved data storage and security protocols, and the promotion of cloud-based and mobile platform integration are required.

Secondly, enhancing the digital competencies of healthcare professionals and implementing continuous professional development programs in telehealth supports maintaining service quality and ensuring patient safety. It is recommended that these training programs comprehensively cover telehealth technologies, data security, patient privacy, and online patient communication.

Furthermore, the development of hybrid care models, the integrated delivery of online and in-person healthcare services, increases patient satisfaction and loyalty and strengthens the continuity of healthcare services. Adopting national and international quality standards will ensure the positioning of telehealth as a reliable and enduring component of the healthcare system.

Finally, telehealth applications should not be viewed solely as a temporary solution during times of crisis; rather, they should be embraced as a permanent model that enhances the resilience of healthcare systems and strengthens patient-centered service delivery. This approach will increase the effectiveness of healthcare services and enable the development of long-term strategies for the sustainable management of public health.

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