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Tele-Oncology And The Covid-19 Phenomenon: A Narrative Review Of Core Findings, Opportunities, And Road Ahead

Tanni Jahan Dina ([1]); Syeda Abida Sultana ([2]); Nafisa Binte Kaderi ([3]); Nusrat Fatema ([4]); Shabnam Mahjabeen ([5]); Jannatul Mawa ([6]); Kamrul Islam ([7])

[1.] MBBS, Sheikh Hasina Medical College and Hospital, Tangail, Bangladesh
[2.] MBBS, Rangpur Medical College, Rangpur, Bangladesh
[3.] MBBS, Shaheed M. Monsur Ali Medical College, Sirajganj, Bangladesh
[4.] MBBS, Popular Medical College, Dhaka, Bangladesh
[5.] MBBS, Shaheed Suhrawardy Medical College and Hospital, Dhaka, Bangladesh
[6.] MBBS, Khwaja Yunus Ali Medical College and Hospital, Sirajganj, Bangladesh
[7.] MBBS, North East Medical College and Hospital, Sylhet, Bangladesh
Corresponding Author:
Tanni Jahan Dina
MBBS, Sheikh Hasina Medical College and Hospital, Tangail, Bangladesh
Email: tannijahanbd@gmail.com
Orcid id: 0009-000987222602 https://orcid.org/0009-0009-8722-2602

Abstract

Background

The global COVID-19 phenomenon initiated an unexpected revolution in oncology care services by presenting telehealth via the internet and telephone, which has become a standardized method. It also ensures ongoing cancer care delivery to safeguard high-risk patients by focusing on the threat of infection, particularly for those affected by carcinoma. Technology-enabled cancer treatment rapidly developed a key intervention to maintain therapeutic guidelines and challenges in healthcare delivery; yet, its fast-tracked adoption has led to visible long-lasting disparities, virtual health inequities, and functioning boundaries within well-being schemes universally. Also, this shift emphasized substantial limitations in digital health awareness and highlighted the demand for enduring, accessible technological implementation in oncology for the upcoming health delivery.

Objective

This narrative review delivers an essential and complete evaluation of the growth of tele-oncology during the COVID-19 surges. This study reveals and investigates significant factors of telehealth application, produces recent research on cancer experimental results and patient experiences in oncology care, comprehensively inspects chronic challenges comprising individuals associated with health equity, strategy, and framework, and recommends research-informed strategies for durable, patient-centered inclusion of digital oncology care into prospective people with malignancies. In addition, this paper highlights the engagement of regulatory bodies, clinical leaders, and tech-based innovators in building infrastructure that supports telemedicine and impactful digital health outcomes.

Methods

A literature review was characterized by using PubMed, Scopus, and Google Scholar databases. The manuscript from 2015 to 2024 was studied, with detailed consideration to carcinoma, telehealth, virtual health, and health justice. We conducted about 47 referenced articles, policy analyses, and formal

guidelines, which were categorically interpreted to cite core understandings into the adoption, execution, findings, and opportunities in teleconsultation in carcinoma treatment. The urgency was specified to research tackling demographically diverse groups and diverse care circumstances to present a broad analysis.

Results
Telehealth in oncology has shown a considerable role in continuity in malignancy treatment in improving patient confidence via increasing access to neoplastic disease care services, mainly between neglected and remote populations. However, major obstacles remain; digital health inequities, fragmented policies, inconsistent reimbursement structures, and infrastructural inadequacies continue to impede broader and more equitable implementation. Furthermore, the integration of emerging digital health technologies such as AI, machine learning, and remote monitoring systems, while promising, necessitates robust governance, validation, and alignment with existing clinical and regulatory frameworks in oncology.

Conclusion
Tele-oncology holds transformative potential to reshape oncology cancer care delivery beyond the exigencies of the COVID-19 crisis. Realizing this potential requires dismantling systemic barriers, addressing the digital health divide, fostering digital health literacy, and embedding telemedicine within robust hybrid oncology care models supported by sustainable policy reforms, adequate reimbursement structures, and equitable infrastructure development. Prioritizing health equity will be essential in these efforts.

1.Introduction

The pandemic occurs due to the SARS-CoV-2 virus, the novel pathogen responsible for a massive burden on medical infrastructure worldwide. According to the WHO, over seven million cases and more than four hundred thousand deaths have been reported across 216 nations by the virus, which has strained the medical sector, with many patients avoiding hospitals. Consequently, it promotes increased use of telemedicine in healthcare disciplines, including oncology care. Tele-oncology is defined as providing cancer services to patients at a distance over voice and video, allowing healthcare providers to bring care to patients who are not physically available to present facilities. This technique has been recognized as beneficial for treating anti-cancer drug therapy, manifestations of illness, and supportive care in oncologic disease. In the meantime, clinical organizations mobilized quickly to reduce infection risks for immunosuppressed individuals with malignant disease, and telehealth transitioned from the sidelines to the leading role of oncology care practices. Before the crisis, the utilization of technical tool applications in carcinoma was narrow and mostly investigational, restricted to limited areas such as community initiative programs or trial programs in a technically proven health platform. Also, strict rules made it hard to apply, complicated reimbursement policies, an insufficient network, and reserved attitudes among professionals emerged from concerns over diagnostic reliability and the integrity of patient-clinician communication. Still, electronic resources are predominantly in lower-income and middle-income states that are short of the capacity to support web-based services on scale.

Though the pandemic's immediate needs swiftly removed several of these blocks. Flexible rules, including Medicare and Medicaid Services and peer groups, helped to facilitate an excessive growth of virtual wellness; as a result, on-screen schedules were paid the same, and confidentiality rules were temporarily relaxed. These actions created the right conditions, making it a key part of care instead of just an extra choice because malignant patients required more protection; thus, it was evidenced to be helpful for follow-up. On the other hand, the fast habit of using virtual devices also revealed unfair differences and produced health inequities due to gaps in net access, set-up, education, and strategy frameworks. The following review investigates the progress of tele-oncology from its speedy adoption during the widespread disruption to its continuing role in forthcoming carcinoma treatment.

2. Methods

This narrative review study utilized a planned database search strategy using three key medical and scientific databases, such as PubMed, Scopus, and Google Scholar. Only articles published between 2015 and 2024 were chosen from the diverse selection of publications assessed, emphasizing malignancy, digital health, remote health, and equitable healthcare access. The analysis encompassed forty-seven pieces of literature review, including peer-reviewed journal articles, health policy papers, and evidence-based medical guidelines. The goal was to explore how tele-oncology was adopted and implemented, especially during the COVID-19 pandemic. An in-depth review was executed on studies that involved varied demographic populations and patient care settings to provide a broader understanding of tele-oncology. The sources included were analyzed to summarize and uncover essential themes and evidence to highlight key findings, challenges, and opportunities in delivering remote oncology care. This review also examined how digital tools were used, the role of patient experience, and how policies supported or limited virtual cancer care delivery.

3. Core Drivers Behind Growth of Tele-oncology

3.1 Coronavirus- Encourage Advancements

The unforeseen emergency was a starting point for the uptake of telehealth in life-threatening disease, especially in Oncopathology, by eliminating persistent obstacles in a flash. The enforcement authorities allow short-term waivers that extend telehealth payments, lower licensing requirements, and, for a limited time, flexibility in U.S. health privacy laws; therefore, these adjustments make it easier to move to e-health options. Several American cancer centers were marked by a greater than four times higher tele-oncology visits during the early age of coronavirus, with comparable tendencies were detected internationally, from Britain's healthcare system to the field of oncologic medicine in Australia and Canada.

Aside from the new regulations, it highlighted that malignant patients risk viral infections, necessitating low-contact care models. Moreover, remote consultations enable patients to continue receiving care without facing the risks of in-person care in clinics and hospitals. Inpatient facility adopted protected video platforms linked to patient files to make communication easier and better care coordination.

3.2 Ready-to-use Information Technology (IT)

Already established Information Technology (IT) drastically supports the instant execution of tele-oncology involving organizations with strong electronic records systems, patient engagement platforms, and video conferencing capacity, promoting remote care in cancer treatment. Furthermore, training programs assisted doctors to learn new skills, which accelerates the change with both old and new tech expertise knowledge to ensure data was safe, systems could share information and make things easier for everyone. Besides using artificial Intelligence (AI) for scheduling meetings, computer-generated waiting rooms, and automated follow-up systems made people more interested in this model, enhancing efficiency, involvement, and optimizing workflows in carcinoma therapy. Also, it made it simpler for professionals to share information and work together, specifically the person undergoing chemotherapy needing support from multiple specialists, for instance, radiologists, pathologists, and palliative care.

3.3 Cancer Survivor-First Considerations

For individuals undergoing cancer treatment, tele-oncology provided notable benefits: less travel, diminished exposure risks, and consistent access to specialized care. Therefore, the advantages shown are particularly valuable for people living in isolated or medically underserved communities, where the availability of stereotypical requirements to travel to urban medical offices to see clinicians is limited. People undergoing telemedicine-based oncology care express high satisfaction due to the ease of usage, economic savings, and the ability to connect caregivers during check-ups. So far, it has become a regular part of treating oncological recipients during outbreaks, changing expectations and prompting extensive demand for its persistence after Covid-19.

4. Contribution and Resulting Impacts of Digital Oncology Care

4.1 Opening Access and Fostering Equity

Tele-oncology has revealed considerable potential to overcome historical disparities in access to comprehensive oncological interventions. Because of these interventions, a data report showed progression in appointments, following prescribed medication, and punctuality in physician official visits with pronounced benefits for marginalized regions. By breaking distance limitations, e-oncology platforms aim to strengthen reach by mitigating the differences arising from unequal reachability to oncologists and medical amenities by broadening qualified supervision to the recipient. The flexible structure of remote oncology offers distinct benefits to those who have experienced thresholds, for example, issues related to transport, impaired mobility, or household caregiving responsibilities that hinder getting therapy for cancer. By leveraging telemedicine, patients nowadays are connected to subspecialists in neoplastic disease who aren't available nearby, hence serving to ensure more wide-ranging assistance is available across diverse populations. Although it has benefited numerous people, the majority are still burdened with this revolutionary approach, owing to persistent inconsistency; consequently, it reinforces the urgency for better administrative plans and systems to make the adoption fair for everyone.

Tabel 1. Summary of Findings of Merits and Demerits of Tele-oncology during the COVID-19 Pandemic.

This table reviews the development and drawbacks of digital technologies in cancer care, including remote appointments, digital monitoring tools, and virtual patient communication systems. It emphasized how these inventions supported access, patient engagement, and uninterrupted care while recognizing blockades associated with connection quality, digital skills, and trust-building.

Source: Summary of finding created by using evidence from references[3–5], [7–9], [14], [16], [25], [38], [43–44], [48].

Categories	Merits	Demerits
Tele-oncology	1.Hassle-free communication. 2. Link patients with provider faster.	1.Access is limited for some groups. 2. Can feel less engaging for certain patients.
Remote appointments	1.Cut down on time and travel. 2. Facilitates family to participate together easily. 3. Rise in attendance or less miss appointments.	1.No hands-on exams possible. 2. Trust-building with new patients is difficult. 3. Poor connections can affect care.
Digital instrument	1.Assists in follow-up visits. 2. Encourages patient learning and self-care.	1.Some patients lack web skills. 2.It may breakdowns or be complex for some users.
Online monitoring	1.Monitors symptoms from a distance. 2. Shows early identification of infection.	1. Information security concerns. 2. Relies on having good device and Wi-Fi.

4.2 Results

During the COVID-19 outbreak, tele-oncology developed as an immense tool to safeguard continuity of oncology care, contributing various benefits across various virtual health care solutions. As a result, tele-oncology allows patient-centered communication and a deeper interpersonal connection between patients and healthcare workers. Still, some distant access remained inadequate for certain groups of people, and patients stated that the experience was impersonal or detaching and was associated with in-office visits. Online appointments remarkably cut the necessity for travel and allow family members to join consultations more effortlessly, contributing to enhanced attendance rates and fewer missed visits. On the other hand, the lack of physical examinations, struggles in establishing trust predominantly with newly established patients, and problems with internet connectivity were noticeable downsides. The use of digital devices further maintained follow-up care and permitted patients to learn through self-learning and health supervision. Still, these tactics were ineffective among patients with restricted technology literacy or those who experienced digital breakdowns. Finally, remote health monitoring schemes have been appreciated for following early symptom finding and diagnosis and simplifying initial infection detection. Despite these advantages, worries around cybersecurity and dependence on fine devices and internet access remain. These findings mirror the potential and boundaries of digital oncological care technologies executed during the outbreak.

4.2 Treatment effectiveness

Multiple analysis demonstrates the effectiveness of e-health in various clinical settings of treating malignancy. At-a-distance consultations have proven helpful for managing follow-ups, handling symptoms, advising on inherited risks, and offering palliative care. This hybrid proposal comforts patients getting therapy, even during health disasters or in places without consultants and health institutions. E-assistance in malignant neoplasm management gathers expert teams to work together, empowering in-depth exchanges between professionals across diverse countries. As a result of teamwork, diagnoses become more accurate, and agreement on strategy plans is encouraged to confirm that patients receive holistic support. According to evidence, individuals affected by this condition do just as well as the provider sees by audiovisual, especially when meeting on-site. Tele-palliative care clearly illustrates how tele-oncology serves with constant warning sign monitoring, checking symptoms regularly, planning for future remedy, and delivering psychosocial support. Within the pandemic, this method has facilitated high-quality attention to reducing non-essential hospice admissions and positioning provision with what matters most to consumers, with the expressed needs and preferences of seekers.

4.3 Enhancing Patient-Provider Satisfaction

Survey data indicate that respondents who are getting and delivering cancer-related health services over hybrid care yield high satisfaction. Reported advantages include that many patients appreciate its convenience, cutting travel costs, and enhancing family engagement in clinical discussions. Similarly, practitioners recognize efficiency gains, more reliable attendance, and being able to care for patients farther away. Clinicians also note constraints, such as the difficulty of doing full physical checkups or building relationships with first-time patients in digital environments. Such concerns advocate for a mix of virtual and in-person approaches in oncology, merging the flexibility of telehealth.

5. Enduring Challenges in Health Equity, Rules, and Resources

5.1 Variability in Technology Accessibility

The promise of tele-oncology will remain incomplete until uneven digital infrastructure is acknowledged. Many people, including seniors, have low socio-economic status, and those in peripheral locations frequently face hurdles due to limited broadband connection, technical school, and confidence, which creates unfair barriers. When access isn't fair, it amplifies existing disparities, preventing high-need groups from reaching tele-oncology. We can fix the technological divide by supplying strong and secure cyber networks, donating phones, tablets, or computers, and providing education to help people feel confident

online. To integrate telehealth in malignancy, identify who needs the most support, and offer backup to those groups with bigger concepts to prevent health differences.

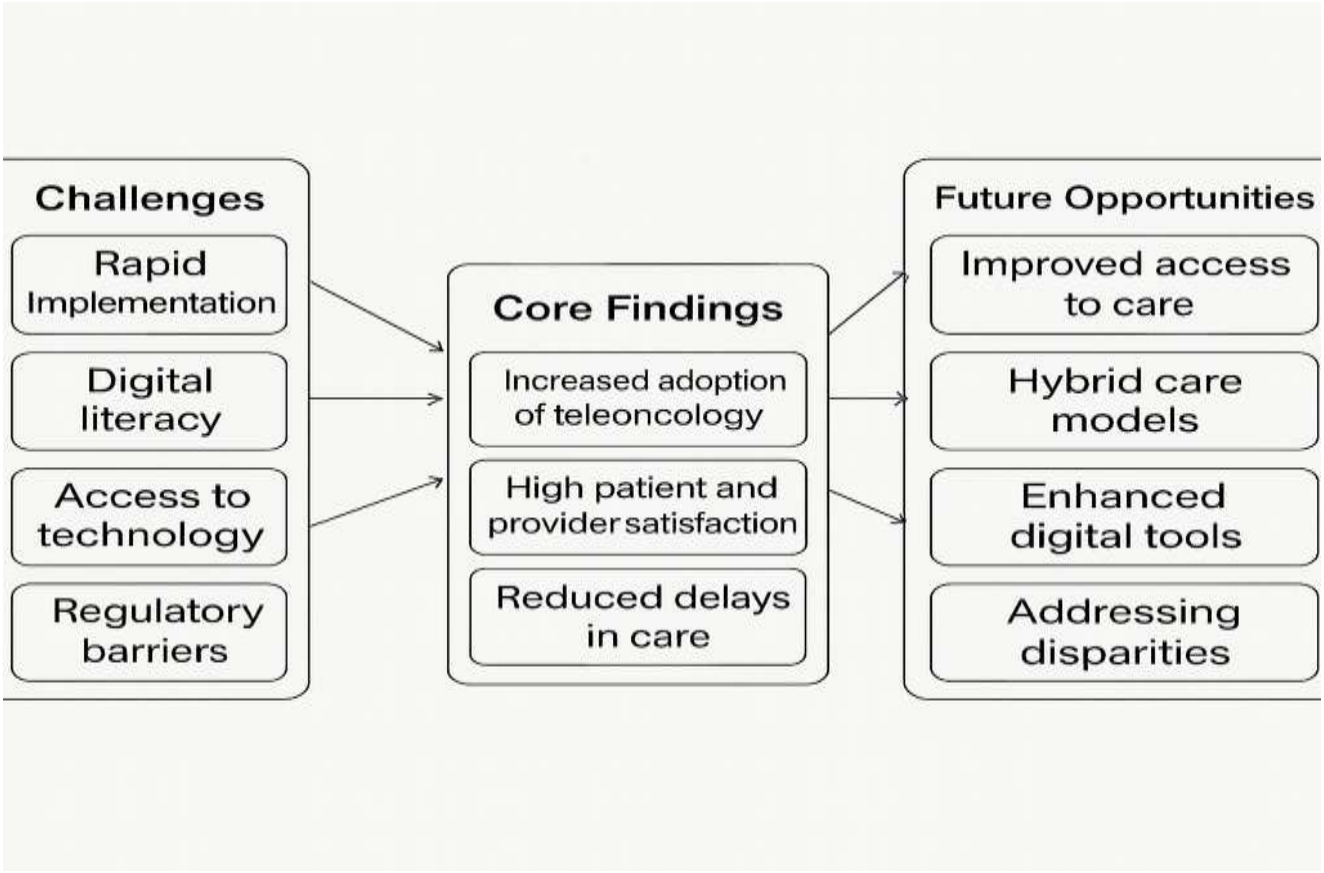
5.2 Regulatory Framework and Economic Compensation

Tele-oncology's long-term success depends on building clear, permanent, and reliable rules, not just the short-term ones, during the pandemic era. If telemedicine and in-person consultation are paid equally, they're more likely to improve digitally delivered health services. To make tertiary oncologic expertise more accessible, structural and regulatory changes are obligatory to update licensing rules so providers can allocate services across different territories and promote multi-state practice to ensure equitable access to oncology professionals. To make tele-oncology a regular part of cancer treatment, standardized billing, informed consent, and privacy laws need to adapt alongside the technology.

5.3 Diagnostic Boundaries

The wide range of advantages of tele-oncology is well recognized; nevertheless, certain facets of care observed in physical evaluations, complex diagnostics, and specific therapeutic procedures remain reliant on direct patient-provider interaction. By merging screen-based follow-ups for routine monitoring and educational sessions, reserving in-person care for clinically necessary procedures requiring direct physical interaction. Beyond that, problems correlated to information security are prerequisites for protecting data and maintaining patient privacy. To keep patient trust and protect health data, solid cybersecurity and following new privacy standards are pivotal to carcinoma prevention.

Figure 1. Conceptual model demonstrating structural limitations, regulatory barriers, tele-oncology inputs, patient experience, and future opportunities in tele- oncology through the COVID-19 era.



sources: figure 1 framework generated from evidence- based on insights from references[1–47].

6. Next Horizons: Artificial Intelligence, Digital Transformation, and Lasting Impact

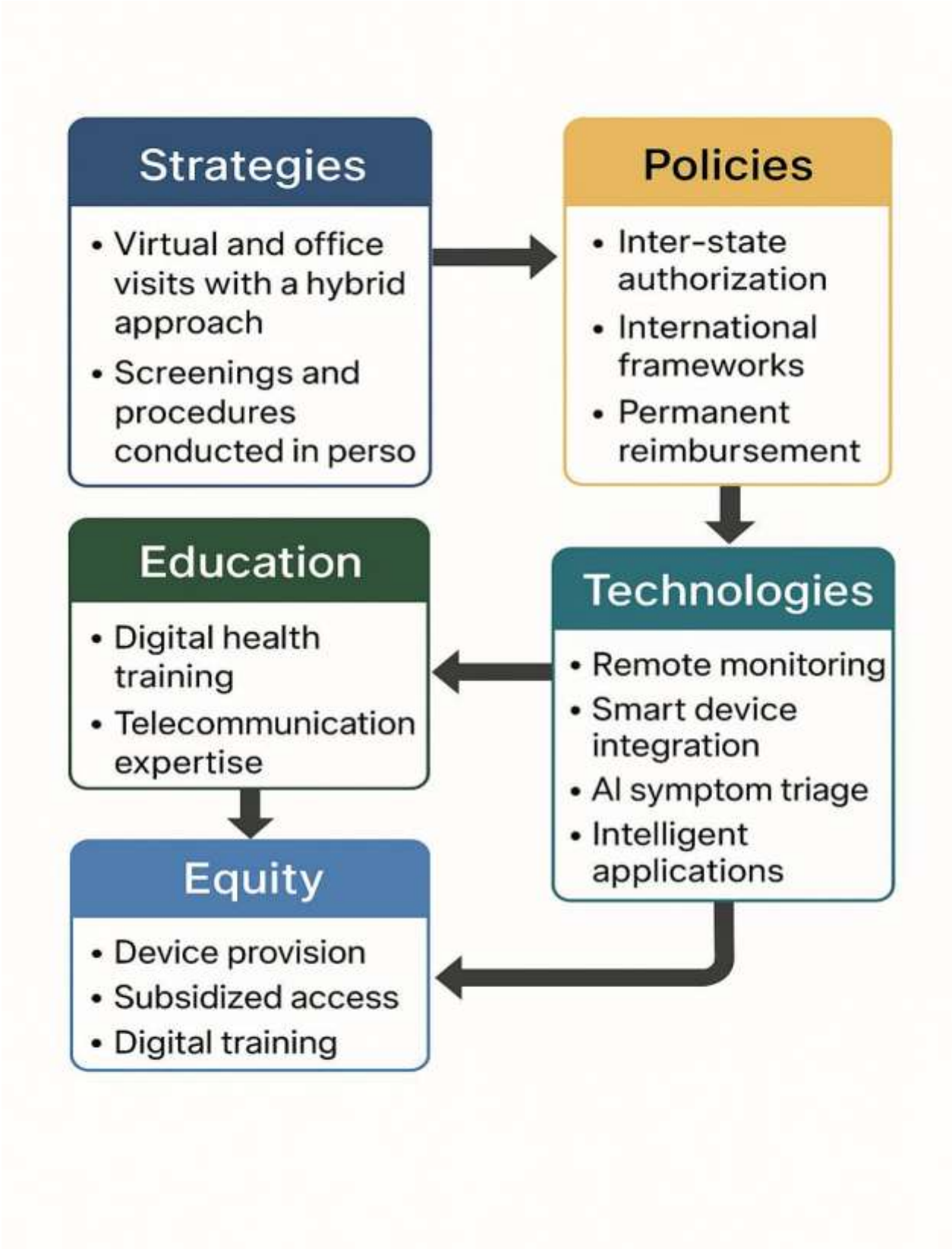
6.1 Fusion of Next-Generation Medical Innovations

New advances in machine intelligence and electronics delivery produce thrilling landscapes to modernize and reshape tele-oncology to introduce new doors for better, higher-performing interventions. In summary, machine learning assists the specialists' doctors by growing clinical predictions, monitoring signs and symptoms with early identification of tumor markers, and simplifying personalized therapies in oncology. Where experts are rare, especially in the countryside, it aids in diagnosis and planning therapy. But before extensive use, deployment demands vigorous testing, proper governance, and continuous integration with existing hospital record-keeping software to maintain clinical utility. Besides, when consuming it to benefit malignant patients distantly, one essential guarantee is to respect the fundamental right to be fair by covering health info privately and safely and always asking for consent before using someone's data.

6.2 Toward Sustainable Care Models

In the future, malignancy cures will combine remote and walk-in visits in precise, lasting options to ensure participants get the best care possible. These perceptions give patients more alternatives to work better and brighter, with shorter time wasted, thus saving resources while concentrating on the patient with extra attention. To maintain uniformity and quality standards for everyone, tele-oncology must be guided by evidence-based guidelines, expert statements, and powerful performance ethics. Correspondingly, cross-sector partnership among clinicians, MedTech innovations, legislators, and advocacy sectors is critical to designing new solutions that spread health equity. By joining forces, these partnerships will lead to innovative and stable solutions that are easy to expand and meet the rising requirements of individuals with malignancies.

Figure 2. This figure shows a combined background involving five main domains—Strategies, policies, education, technologies, and equity- that help to bring about sustainable change in tele-oncology care. Individually, area summaries targeted activities like workforce training (Strategies), policy reform (Policies), digital health education (Education), smart device integration (Technologies), and subsidized access (Equity). Arrows show the guiding flow and interconnection among domains, highlighting system-level configuration and collaborative investment to improve access, quality, and patient-centered care in remote cancer care.



sources: figure 2 was generated from evidence-based insights drawn from references[1–6].

6.3 Creating Equitable Opportunities

To bridge the electrical shortfall, we must confirm each has the right to use fast and reliable web connections, no matter where they live. Likewise, electronic devices, such as smart cellphones, tablets, and laptops, are affordable enough for many citizens to own. Lastly, all society participants deserve chances to acquire knowledge of ICT in traditions that make them feel happy and are usual to them through education and exercise. Local programs can help address people's unique barriers, while broader policies ensure that these tools remain affordable and easy to access. Community-based programs can address localized barriers, while broader policy measures ensure the affordability and accessibility of necessary technologies. Community-driven efforts can overcome local problems while higher rules work to secure the affordability and availability of thoughtful technologies. To help all sufferers, authorities can fund e-equipment or direct them by teaching. These actions align with broader public health goals to diminish divergences and enrich outcomes for various backgrounds.

7. Conclusion

Tech-supported cancer care signifies a groundbreaking shift in how easy it is for people to get treatment, showing flexibility instead of gaps in medical facilities, and bringing new possibilities for tomorrow. To succeed, therapeutic approaches must eliminate long-standing difficulties, strengthen pathways to electronic equipment, and merge telemedicine with patient-centered oversight with live interaction and virtual options. Nevertheless, reunion plans, techniques, and additional skill technology, guided by fairness and quality care, will shape how hybrid cancer care grows in the upcoming years.

Despite this, constant, interdisciplinary, and well-structured edges in research, teamwork, and medical legislation, efforts are vigorous to ensure that tele-oncology spreads in a way that meets the wishes of both patients and healthcare workers, with a focus on improving health inequities and reducing disparities, while also boosting the total quality and security of hybrid care in oncology. Eventually, harmonized attempts will fortify the durability of malignancy care arguments and guarantee that innovations in e-health will have a prolonged influence on well-being, justice, and global impact.

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Declaration of Interest

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Ethical Statement

This is a narrative review article and does not contain any original study research including human participants or animals conducted by the authors. Hence, ethical consent was not obligatory in this study content.

Consent to Participate

Not applicable.

Consent for Publication
Not applicable.

Data Availability Statement
The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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