

Implementing Telemedicine in Vietnam: Opportunities, Challenges, and Recommendations

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Abstract: Healthcare and telemedicine play a crucial role in national development, both in Vietnam and globally. Although telemedicine has existed and evolved since the 1990s, health disparities remain a persistent challenge across various regions of Vietnam, affecting both rural and urban populations and limiting equitable access to patient-centered healthcare. Therefore, Vietnam should implement proper solutions in order to maintain and enhance the benefits of applying the telemedicine system in Vietnam while reducing the strain negatively affecting this system.

Keywords: Telemedicine, telehealth, healthcare, healthcare professionals

I. INTRODUCTION

Healthcare is not merely a personal matter but also a key driver of national development (Ong et al., 2022). While global healthcare spending reached \$9 trillion in 2020 (WHO, 2022), systems remain strained due to aging populations and chronic diseases (Clemensen et al., 2011). Telemedicine, in this case, offers a viable solution to bridge the supply-demand gap, lower costs, and improve access (Tan et al., 2024), particularly for specialized care in remote areas (Alvandi, 2017). The COVID-19 pandemic in 2020 marked a turning point, accelerating telemedicine adoption as a mainstream healthcare delivery method (American Telemedicine Association, 2020).

Vietnam has utilized telemedicine since the late 1990s, initially in military healthcare units by connecting military hospitals with remote clinics via radio waves (Hieu et al., 2023). In 2023, the Ministry of Health launched the VTelehealth Platform (Decision No. 823/QD-BYT), integrating teleconsultation, electronic health records, and digital health services. This initiative supports a comprehensive telemedicine system, strengthening primary care and ensuring nationwide access to safe, efficient medical services. The Vietnamese government has introduced various policies to promote telemedicine, including technology deployment, pilot programs, and legal reforms. However, adoption relies on physician acceptance, shaped by perceived benefits, skills, and infrastructure. Examining how policies influence physicians' intent to use telemedicine is crucial for policy optimization, expanding telemedicine, and advancing digital healthcare in line with Decision No. 749/QD-TTg (2020) of The Prime Minister.

Rising healthcare demand further underscores the need for telemedicine research in Vietnam. It reduces disparities in access, particularly in rural areas, while cutting costs and wait times (Ministry of Health, 2023). Urbanization and industrialization also drive demand for more convenient care (Anh, 2022). With 84.4% smartphone penetration in Vietnam, telemedicine implementation is highly feasible (Ministry of Information and Communications, 2024). Thus, further research is essential to enhance healthcare quality in Vietnam.

II. THE HISTORY OF TELEMEDICINE IN VIETNAM

Before 2000, telemedicine in Vietnam was in its infancy and largely unknown. The 1998 telemedicine project, linking an U.S.-based unit, three central hospitals in Vietnam, and Hanoi Medical University for remote consultations, was only a pilot with no official framework for expansion. No research materials or training programs existed for healthcare professionals, limiting awareness and adoption. The public was entirely unfamiliar with telemedicine, which remained confined to small-scale collaborations with minimal impact on the healthcare system.

The 2000-2015 period marked a significant expansion of telemedicine in Vietnam, with leading hospitals such as VietDuc (Vietnam-Germany Hospital), Vietnam National Heart Institute, and the Central Military Hospital 108 at the forefront. The introduction of telemedicine clinics via Local Area Network (LAN) and remote-guided surgeries paved the way for modern healthcare applications (National Hospital of Tropical Diseases, 2012). A key milestone was the 2004 international conference at Quang Trung Software Park, where Vietnamese and American experts discussed Picture

archiving and communication system (PACS), remote consultations, and Hospital Information System (HIS). Between 2003 and 2007, the “Satellite Hospital of Việt Đức” project connected six lower-tier hospitals to ease overcrowding and improve care. A notable success was the 2005 remote surgery between Việt Tiệp Hospital (Hai Phong Province) and Việt Đức via Vietnam Posts and Telecommunications Group (VNPT) infrastructure. In 2006, the Vietnam National Heart Institute held a live teleconference with Singapore for a cardiac intervention, advancing international medical collaboration. Meanwhile, the Ministry of National Defense deployed telemedicine at Hospital 108 and Military Hospital 175, using Digital Imaging and Communications in Medicine (DICOM) and Transmission Control Protocol/Internet Protocol (TCP/IP) for diagnostic imaging transmission. Vietnamese tech firms like SaigonTech developed Picture archiving and communication systems (PACS) and Electronic health record (EMR), laying the groundwork for digital hospitals. However, telemedicine faced infrastructure challenges, with VNPT and satellite-based transmissions lacking stability and hospital connectivity remaining limited. Despite these constraints, this phase was a critical testing period, setting the stage for future advancements.

Over the 2015-2020 span, Vietnam made notable progress in telemedicine through infrastructure upgrades, network expansion, and initial regulatory efforts. However, technological, financial, and policy constraints kept the sector largely in its pilot phase. Investments in IT infrastructure improved internet connectivity and healthcare information systems, supporting remote medical services and digital healthcare management (Ministry of Health, 2020). The telemedicine network thus expanded, strengthening hospital connections, reducing central hospital overload, and enhancing care at lower-tier facilities. Healthcare workforce training was also prioritized to support the integration of telemedicine applications, while international cooperation played a crucial role, particularly in deploying services in underserved areas. Despite these advances, challenges persisted. Limited medical equipment and telecommunication infrastructure hindered widespread adoption. The regulatory framework remained underdeveloped, with Circular No. 49/2017 issued by the Ministry of Health permitting only six categories of telehealth services, forcing other applications to undergo case-by-case approval for pilot implementation. Financial barriers also stalled expansion, as telemedicine lacked a defined fee structure and was excluded from health insurance, placing the cost burden on patients. While progress was evident, telemedicine remained in its pilot phase, laying the foundation for more robust development in the following years.

Under the impact of the COVID-19 pandemic (2020-2022), telemedicine has become an optimal solution, helping to connect people and playing an important role in the diagnosis and treatment process at many medical facilities (Monaghesh & Hajizadeh, 2020). According to the World Health Organization, Vietnam has controlled the pandemic very effectively with its strong political system and the active application of modern technology (UN News, 2020). To cope with the COVID-19 pandemic, in 2020, the Vietnamese Ministry of Health issued Project 2628/QĐ-BYT, approving the plan to deploy telemedicine services in the period of 2020-2025 (Ministry of Health, 2020). In June 2020, the National Steering Committee established the COVID-19 Remote Medical Center, regularly organizing online consultations with the participation of leading experts across the country. These consultations help discuss treatment plans, share experiences in inpatient care, and create a seamless connection between regions, regardless of geographical distance or medical level (Le & Tran, 2024). The establishment of the Remote Medical Center marks an important step forward in developing a medical examination and treatment system based on advanced technology, especially in the treatment of dangerous infectious diseases such as COVID-19 (Le & Tran, 2024). By the end of 2021, the remote medical examination and treatment network in Vietnam had been expanded to 1,500 medical facilities from the central to provincial and district levels, with the participation of 4,000 central-level medical experts and 15,000 lower-level experts.

III. OPPORTUNITIES AND BENEFITS OF IMPLEMENTING TELEMEDICINE IN VIETNAM

Opportunities

Telemedicine has been introduced in Vietnam for more than two decades, however, integration into the regular healthcare system has encountered many obstacles. It was not until the outbreak of the COVID-19 pandemic that the need to expand telemedicine consultation services became urgent, promoting strong development in the hospital network. This is a great opportunity for Vietnam to accelerate the digital transformation process in the healthcare sector, improving people's access to remote healthcare services (MIC Vietnam, 2019).

The Ministry of Health (Vietnam) has pioneered the development and deployment of online public services, contributing to creating a solid foundation for telemedicine. The Ministry of Health's e-Government Architecture has been established, providing important reference models and data platforms such as the public service portal, pharmaceutical database system, and national vaccination information management. The digitalization of all medical administrative procedures helps improve management efficiency and facilitates the implementation of remote consultation services nationwide (MIC Vietnam, 2019).

The strong development of information technology in medical facilities also creates great opportunities to expand telemedicine. By 2019, all public hospitals in Vietnam had deployed hospital information systems (HIS), almost all medical facilities had implemented electronic health insurance, and more than 60,000 drug supply facilities applied management software. Connecting data between medical facilities with pharmaceutical data banks improves operational efficiency and helps enhance the ability to coordinate remote treatment between medical levels (Tran, 2020; Thuy Hang, 2020).

In addition, mobile applications in healthcare are increasingly popular in Vietnam, opening up many opportunities for telemedicine. The trend of using medical, fitness and nutrition applications is increasing rapidly, with many applications developed specifically for Vietnamese people such as PVDApps (heart rate measurement), Cai Thuoc La (smoking cessation support), Eatsy (weight loss), UpRace (sports tracking). Smartphone users in Vietnam have a higher level of acceptance of medical applications than many other countries, creating favorable conditions for expanding digital healthcare services (Do et al., 2018).

The health tech startup ecosystem is disrupting the way people access healthcare. Over the past five years, a series of healthcare applications have emerged, making it easier for people to book appointments with doctors through platforms such as Medpro, Docosan, and VOVdoctor 24. In addition, many applications have expanded their services, providing medical information (Hellobacsi), a directory of medical facilities (ViCare), remote consultation (Jio Health, Med247, eDoctor), home testing (MedOn, MyMedlatec), and home healthcare (BlueCare). The development of these applications benefits patients and also helps medical facilities expand their reach and improve service quality (Lopez et al., 2021).

Benefits

Telemedicine plays an important role in bridging the gap in access to health services, reducing costs, and improving the quality of health care. Many recent studies have shown that the application of telemedicine in specialist consultations helps connect primary care physicians, specialists, and patients, thereby improving treatment coordination and speeding up the diagnosis process (Kvedar et al., 2014). In particular, telemedicine provides a suitable solution for underserved populations, those who have difficulty with time and cost of traveling to a health facility, patients with poor health or chronic diseases, as well as individuals who are busy with work and family. With its flexibility and convenience, telemedicine contributes to maintaining continuity in health care, in line with the Vietnamese Government's goal of ensuring equitable access to quality health services for all people (Vu et al., 2024).

In addition, telemedicine improves the quality of treatment and supports distance medical education, contributing to improving the qualifications of health workers, improving public health care and health management in Vietnam. Remote consultation helps medical teams access specialized knowledge, develop effective treatment regimens, ensure timely referral or evacuation of patients, and improve diagnostic accuracy. With a high-quality telehealth system, medical decisions are made quickly, shortening diagnosis times, managing patients more effectively, and reducing hospital stays and intensive care unit treatment. In addition, telemedicine also helps reduce patient anxiety, increase confidence in treatment, and limit unnecessary procedures (Nguyen et al., 2021).

The application of telemedicine technology helps doctors connect with patients conveniently and save time through methods such as video calls, email, and online medical portals. In addition, it also supports medical experts to consult directly in real time. In particular, this service is very useful for patients who need to follow up after treatment without a direct examination, such as monitoring drug side effects or answering non-urgent questions after surgery (Monaghesh & Hajizadeh, 2020). In Vietnam, telemedicine plays an important role in improving the quality of medical services in remote areas. With this technology, patients can receive advice and prescriptions from leading specialists at major hospitals without having to travel far, saving time and money. In particular, many patients in rural areas want to be treated directly by central doctors because they trust their expertise and experience. As a result, telemedicine not only improves access to medical services but also increases patient satisfaction and engagement in the treatment process (Nguyen et al., 2021).

One of the notable benefits of telemedicine is its ability to limit the spread of infectious diseases. This technology is considered an effective solution in the fight against the COVID-19 pandemic, as it helps reduce the risk of exposure to the SARS-CoV-2 virus (Chauhan et al., 2020). In Vietnam, hospital-acquired infections are a significant challenge, especially in tropical climates where the risk of infection is high. Telemedicine with digital solutions helps reduce the number of patients who have to go to the hospital directly, limiting the risk of infection for both patients and healthcare workers (Nguyen et al., 2021). Therefore, telemedicine plays an important role in maintaining social distancing and controlling the spread of the disease in the community.

IV. CHALLENGES IN IMPLEMENTING TELEMEDICINE IN VIETNAM

Despite significant efforts from government authorities and healthcare professionals to promote the development of telemedicine, its implementation in Vietnam faces considerable challenges across multiple dimensions. Firstly, from a technological and infrastructural perspective, the lack of adequately equipped teleconsultation rooms and medical equipment in many hospitals severely limits the effectiveness of remote healthcare services. According to the United Nations Development Programme (UNDP) report on the "PROJECT ON GRASSROOTS TELEMEDICINE CONSULTATION USING THE SOFTWARE "DOCTOR FOR EVERYONE" (2023), the most significant barrier to telemedicine adoption at the primary healthcare center level is the lack of smart devices, low digital literacy among healthcare workers and patients, and unreliable telecommunications infrastructure. Even at major hospitals, only one or two telemedicine rooms meet the required information technology (IT) standards, while, on average, each province or city has only five to six hospitals with adequately equipped teleconsultation facilities (Hieu et al., 2023). Many hospitals do not yet perceive telemedicine infrastructure as a priority, resulting in limited investment in necessary technological upgrades and significant challenges in telemedicine deployment. Furthermore, the limited availability of telemedicine software constrains system development, as Vietnam currently lacks a diverse and comprehensive range of digital platforms capable of supporting widespread telehealth implementation.

Human resource limitations present another major obstacle, particularly in rural and district-level healthcare facilities, where IT personnel are both insufficient in number and often lack the expertise necessary to maintain and operate telemedicine systems (Nguyen et al., 2023). According to the 2023 UNDP report, staffing shortages across all healthcare facilities make it difficult to allocate dedicated personnel for 24/7 telemedicine support, particularly in lower-tier hospitals. Even at the regulatory level, a shortage of specialized staff results in inadequate supervision and delayed technical assistance. Additionally, healthcare professionals, including physicians and nurses, have not received sufficient training in utilizing telemedicine platforms, conducting remote examinations, or integrating digital consultations into standard medical practice. The UNDP report further highlights that the limited training and capacity-building initiatives for healthcare workers have resulted in poor IT proficiency, hindering the installation, operation, and effective use of telemedicine systems. This lack of expertise and dedicated personnel continues to impede the efficient operation of telemedicine services.

Financial constraints further exacerbate these challenges, as the costs associated with establishing telemedicine infrastructure, procuring advanced medical equipment, training personnel, and maintaining operational efficiency remain prohibitively high. Although Decision No. 2628/QĐ-BYT provides financial provisions for telemedicine initiatives, many healthcare institutions struggle to secure adequate funding, making large-scale implementation difficult (Hieu et al., 2023). Moreover, as of now, telemedicine services have not been included in the list of medical services covered by Vietnam's health insurance system. Consequently, there is no reimbursement mechanism for medical staff at local healthcare centers providing remote consultations, nor for specialist doctors at higher-tier hospitals participating in teleconsultations. Group discussions in the UNDP report also reveal that not only are healthcare professionals not compensated for their telemedicine consultations, but they also often have to personally cover internet connection costs when using their mobile phones for remote consultations (United Nations Development Programme, 2023). Additionally, the affordability of telemedicine services remains a concern for patients, particularly those from low-income backgrounds, further restricting equitable access to healthcare. Without sufficient financial support, both healthcare providers and patients face barriers to fully utilizing telemedicine solutions.

Regulatory and legal barriers also hinder the expansion of telemedicine in Vietnam. The absence of a comprehensive legal framework governing telehealth services—including clear guidelines on liability, insurance reimbursement, and standardized clinical protocols—creates uncertainty for both healthcare providers and patients. The lack of explicit policies regulating telemedicine pricing and reimbursement mechanisms further discourages investment in the sector. Additionally, as telemedicine remains a relatively new model of care in Vietnam, public skepticism regarding its reliability and effectiveness persists (Vu et al., 2024). These challenges necessitate a strategic approach that includes infrastructure investment, workforce development, financial support mechanisms, and regulatory reforms to ensure the long-term sustainability and accessibility of telemedicine in Vietnam.

V. RECOMMENDATIONS

For authorities

First, the Vietnamese government should prioritize investments in expanding internet infrastructure and ensuring a stable electricity supply in rural areas to facilitate the effective deployment of telemedicine. Similar to recommendations for healthcare facilities, a specific solution is to collaborate with telecommunications companies such as Viettel to install additional 4G/5G towers or fiber-optic cables in remote areas while incentivizing them through tax benefits or subsidies. Additionally, the adoption of renewable energy sources, such as solar power, could provide a reliable electricity supply for healthcare centers and essential medical equipment. Another viable approach is the

implementation of government-sponsored programs that subsidize the purchase of affordable smart devices, such as smartphones or tablets, for both the general population and healthcare personnel, ensuring broader access to telemedicine services.

Second, to address the lack of regulatory frameworks for telemedicine, the government must establish clear policies concerning licensing, service quality standards, and medical data security. For instance, incorporating telemedicine-specific provisions into the Law on Medical Examination and Treatment would create a solid legal foundation for healthcare institutions to operate effectively. Additionally, updating the Cybersecurity Law to include regulations on safeguarding medical data is crucial to ensuring patient privacy. The government should also develop a legal framework that allows inter-provincial telemedicine services, enabling healthcare professionals to assist patients across different regions without facing jurisdictional restrictions. Finally, integrating telemedicine into the national health insurance reimbursement system would alleviate financial burdens for patients, promoting equitable access to remote healthcare services.

Third, to attract and retain healthcare professionals, the government could introduce incentive policies such as salary increases, housing assistance, or additional social benefits for medical personnel working in remote and underserved areas. Moreover, telemedicine should be leveraged as a tool to connect urban-based medical specialists with rural patients, thereby reducing the workload for local healthcare providers. A feasible solution is to establish telemedicine centers at the provincial level, equipped with the necessary technology and trained personnel. Simultaneously, the government should collaborate with healthcare institutions to organize training programs for rural healthcare workers, equipping them with the necessary skills to operate telemedicine systems and support patients effectively. Partnering with international organizations such as the United Nations Development Programme (UNDP) to implement pilot projects could provide valuable insights and contribute to the nationwide expansion of telemedicine human resources.

For hospitals and healthcare centers

First, to address the shortage of digital infrastructure, healthcare centers in Vietnam can collaborate with telecommunications providers such as Viettel or VNPT to enhance internet connectivity in remote and underserved areas. Negotiating preferential service packages or installing additional transmission towers would significantly improve network speed and stability. Additionally, healthcare centers should leverage funding from the government or international organizations such as the United Nations Development Programme (UNDP) to procure essential equipment, including computers, webcams, and telemedicine software. An effective approach would also involve conducting local needs assessments to ensure targeted investments that align with budgetary constraints and practical demands.

Second, in the absence of specific national regulations governing telemedicine, healthcare centers must take proactive measures to establish internal policies for managing and safeguarding patient information. This may include implementing data encryption software, developing clear consent forms, and providing detailed information to patients regarding telemedicine procedures and associated risks. Furthermore, healthcare centers should closely monitor policy updates from the Ministry of Health and participate in professional associations to stay informed about regulatory developments. Establishing internal standards not only ensures privacy protection but also fosters public trust in telemedicine services. This proactive approach is essential for maintaining service quality and legal compliance while awaiting the completion of a comprehensive regulatory framework.

Third, to mitigate disparities in healthcare workforce distribution across regions, healthcare centers should leverage telemedicine to connect rural patients with urban-based specialists, thereby supporting local medical personnel. In other words, short-term training programs for existing staff, such as nurses or technicians, on the operation of telemedicine equipment could serve as a viable solution. Additionally, collaboration with international organizations or leading urban medical centers to share expertise and enhance professional capacity would improve service quality. Encouraging staff to participate in online courses or specialized workshops further enhances skill development and fosters a culture of continuous learning. These efforts not only optimize existing human resources but also bring high-quality healthcare services closer to populations in remote areas.

For physicians and healthcare professionals

The acceptance and support of healthcare professionals play a vital role in promoting the widespread adoption and effectiveness of telemedicine in Vietnam. To fully unlock the potential of telemedicine, healthcare professionals must proactively embrace innovation, adopt a forward-thinking mindset, and integrate digital health technologies into their medical practice. Ministry of Health (Vietnam) has also emphasized that telemedicine not only mitigates disparities in healthcare access but also eliminates geographical and economic barriers for vulnerable populations. Therefore,

continuous professional development and ongoing education in telemedicine are essential for healthcare providers. This includes not only medical knowledge related to remote diagnosis and treatment but also the technical skills required to operate digital healthcare systems efficiently, ensuring that patients can access telemedicine services safely, conveniently, and effectively. Innovation is driven not only by technology but also by people. A healthcare workforce that is open to change and ready to adapt will be a crucial driving force in making telemedicine an integral part of Vietnam's modern healthcare system.

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