

Innovation in Military Health: The Role of Telemedicine in the Operational Readiness of the Brazilian Army

Innovación en salud militar: el papel de la telemedicina en la capacidad operativa del Ejército Brasileño

Abstract: This article examines telemedicine as a strategic tool for enhancing the operational readiness of the Brazilian Army. It begins by contextualizing the concepts of telemedicine and telehealth, addressing their applications and challenges within the broader healthcare landscape. By analyzing the clinical and economic dimensions, alongside the ethical risks involved, this study aims to contribute to the development of safe and effective guidelines for implementing this technology in a military environment. The methodology is qualitative, grounded in a narrative review of scientific literature, institutional documents, and international experiences in military healthcare. By integrating information and communication technologies into clinical practice, telemedicine shows potential to optimize remote communication, uphold healthcare quality standards, promote equitable access to care, and reduce operational costs. Nevertheless, successful implementation demands rigorous adherence to ethical and legal principles in order to ensure data privacy, information security, and the integrity of care delivery.

Keywords: Telemedicine; Telehealth; Brazilian Army; Military operational readiness; Clinical aspects; Economic aspects; Medical ethics.

Resumen: Este artículo explora la relevancia de la telemedicina como herramienta estratégica para mejorar la capacidad operativa del Ejército Brasileño (EB). Al principio, se contextualizan los conceptos de telemedicina y telesalud, así como sus aplicaciones y desafíos en el escenario general de la salud. Luego, mediante un análisis de los aspectos clínicos y económicos, así como de los riesgos éticos que implican, el estudio busca contribuir al desarrollo de directrices seguras y eficaces para implementar esta tecnología en el entorno militar. Se utilizó una metodología cualitativa, basada en revisión narrativa de literatura científica, documentos institucionales y experiencias internacionales en salud militar. La telemedicina, al integrar las tecnologías de la información y la comunicación en la práctica clínica, demuestra el potencial para optimizar la comunicación remota, mantener los estándares de calidad en los servicios de salud, promover el acceso equitativo y reducir los costos operativos. Sin embargo, su implementación requiere una rigurosa observancia de los principios éticos y jurídicos para garantizar la privacidad de los datos, la seguridad de la información y la integridad de la atención.

Palabras clave: Telemedicina; Telesalud; Ejército Brasileño; Capacidad operativa militar; Aspectos clínicos; Aspectos económicos; Ética médica.

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Received: Aug. 07, 2025

Approved: Apr. 09, 2026

COLEÇÃO MEIRA MATTOS

ISSN on-line 2316-4891 / ISSN print 2316-4833

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1 INTRODUCTION

The development of modern conflicts and the increasing complexity of military operations pose substantial challenges to delivering healthcare in operational settings. A dynamic, austere, and often remote theater of operations requires innovative and technologically advanced solutions to ensure the continuity of medical care for combatants. In this scenario, innovation in military health emerges as an essential strategy to ensure operational readiness, force preservation, and mission effectiveness.

In the Brazilian Army, medical care in hard-to-reach areas such as the Legal Amazon, dry borders, and areas where troops operate in Grantee of Law and Order Operations (GLO) requires health solutions adapted to the country's geographical, climatic, and logistical realities. Expanding access to specialized medical care without the need to evacuate or deploy military personnel represents a strategic differential, especially when seeking to preserve the operational capacity of troops in action.

Incorporating telemedicine into the military setting is a strategic advance of how health services are planned and operationalized hard-to-reach or high-complexity environments. By enabling diagnoses, continuous monitoring, and clinical decisions at a distance, with support from specialists located in urban centers or reference units, this technology reduces dependence on on-site medical teams and significantly increases problem-solving capacity at the tactical level. Given these potentials, this research critically analyzes the institutionalization of telemedicine within the Brazilian Army, identifying its most promising applications, operational impacts, and challenges for its consolidation as a tool to support the readiness and sustainability of the Military Health System.

By considering telemedicine as a tool to support operational health, this study reflects on its practical application within the Brazilian Army, addressing the clinical, economic, strategic, and ethical aspects involved in its implementation and institutionalization as an innovation vector in military health.

2 METHODOLOGY

Based on a qualitative, exploratory, and descriptive research, this article discusses the potential of telemedicine as a strategic tool within military health. It sought not to test formal hypotheses, but rather to gather and critically analyze theoretical and empirical information on telemedicine institutionalization in the military environment.

We chose, as our methodology, to conduct a literature narrative review of scientific articles, technical reports, legislation, and national and international institutional documents. Priority was given to sources that address telemedicine within the Armed Forces, especially regarding operability in remote environments, resource savings, clinical impacts, and ethical-legal challenges. Contributions from the literature on Defense Studies focusing on technological innovation, digital sovereignty, and strategic capability were also included.

Secondary data was retrieved from the SciELO, PubMed, and Google Scholar databases, and the *Cadernos de Estudos Estratégicos* repository from the Center for Military Memory (CMM - *Centro de Memória Militar*). Document selection considered their relevance, currentness (last decade, specifically the last five years) and applicability to the Brazilian military context.

Content analysis was structured in three thematic axes: (1) fundamentals and characteristics of telemedicine in the military context; (2) clinical aspects and typology of applications in the Brazilian Army; and (3) economic impacts of institutionalization. Synthesis followed an interpretative and critical approach, seeking to identify gaps, opportunities, and practical implications for formulating public policies on military health.

3 FUNDAMENTALS OF TELEMEDICINE AND TELEHEALTH

Telemedicine is a specialized field of medicine that integrates information and communication technologies (ICTs) into clinical practice; it allows healthcare services to be provided from a remote location. This modality covers several applications, including synchronous and asynchronous consultations, remote patient monitoring, clinical diagnosis, treatment, specialized second opinion, continuing health education, and the efficient exchange of clinical data between healthcare professionals (Brasil, 2022; Field, 1996; Zuccotti, 2023; Gellad, 2023). Importantly, telemedicine configures a subset of telehealth, a broader concept that encompasses both clinical services mediated by technology and activities related to health education, public health, and health management (Gellad *et al.*, 2023).

According to the World Health Organization (WHO), telehealth is the provision of health services in situations where distance is a critical factor and in which ICT is used for various purposes, such as diagnosis, treatment, prevention, research, evaluation, and continuing education (Takahashi, 2022). Telemedicine, within this context, can be categorized into three main modalities: synchronous interactions, which perform real-time communication such as videoconference consultations; asynchronous interactions, which involve the exchange of information at different times via email or text messages; and remote monitoring, which is based on the collection and analysis of patient data without the need for in-person contact (Takahashi, 2022).

Telemedicine has been increasingly integrated into health systems, especially due to the COVID-19 pandemic and its intrinsic potential to improve quality of care, reduce hospital readmission rates, and generate considerable cost savings (Hyder; Razzak, 2020). This practice proves to be particularly valuable in regions facing a shortage of experts, as illustrated by the “Hub and Spoke” model applied to epilepsy treatment, in which local clinics establish connections with experts located in referral centers (Lavin; Gray, Brodie, 2022). Adoption of telemedicine is underpinned by growing evidence indicating health outcomes comparable to those of traditional in-person care, with additional benefits such as increased patient satisfaction and engagement in their own care (Obstetrics and Gynecology, 2020).

Additionally, telemedicine positively impacts patient adherence to treatment regimens and post-consultation follow-up, primarily via increased accessibility, convenience, and patient

engagement. Kruse (2023) emphasize that telemedicine is highly patient-centric, catering to their digital preferences and offering greater convenience, which can result in greater physician engagement and health-friendly behavioral changes. The American Heart Association reinforces that telehealth can potentially improve medication adherence and patient engagement, especially those with chronic conditions, by enabling continuous monitoring and favoring shared decision-making between physician and patient (Schwamm, 2017).

In pediatric care, telehealth has been associated with reduced absenteeism from appointments and increased adherence to recommended therapies, crucial factors for the effective management of several diseases (Curfman, 2022). Similarly, in caring for patients with diabetes, telehealth has been shown to effectively expand timely access to health services and improve glycemic control, particularly in resource-limited regions (Diabetes Care, 2025).

Several studies corroborate that telemedicine presents health outcomes comparable to those of traditional care in areas like mental health, management of chronic diseases, and specific conditions such as inflammatory bowel disease (Gellad, 2023). According to scientific literature, while telemedicine may require in-person follow-up visits in acute cases, it is especially suitable for managing stable chronic conditions, contributing to reduced hospitalization rates and improve patients' quality of life (Gellad, 2023).

Overall, telemedicine improves quality of care and patient satisfaction by offering flexible and on-demand care, in addition to reducing significant barriers such as transportation costs and time spent, factors that directly impact adherence and care follow-up (Obstetrics and Gynecology, 2020; Schwamm, 2017). It is, however, critical to consider and address potential barriers such as data privacy concerns and inequalities arising from the digital divide to fully optimize the benefits of telemedicine (Horberg, 2024).

Telemedicine-based interventions show significant benefits for specific populations, especially regarding treatment adherence and expanded access to health care. Regarding chronic conditions, telemedicine has been shown to be effective in improving glycemic control in individuals with diabetes, particularly in rural areas where access to health facilities is limited. Use of telehealth modalities like videoconferencing and remote monitoring is associated with reduced glycated hemoglobin (HbA1c) levels and improved self-care education and support (Diabetes Care, 2025).

Additionally, telemedicine proves beneficial for patients with stable chronic gastrointestinal diseases, such as inflammatory bowel disease (IBD), by reducing the burden of travel and facilitating access to mental health services (Gellad, 2023). In pediatric care, telemedicine is particularly advantageous for children with special health needs and for those who live in low-resource regions, expanding access to primary and specialized care, reducing absenteeism in consultations, and improving adherence to recommended therapies. Integrating telehealth into the "pediatric medical home" model ensures continuity and coordination of care, essential aspects for managing chronic or complex conditions (Curfman, 2021).

In regions with limited resources, telemedicine contributes to reducing transportation costs and expanding access to essential services, favoring treatment adherence and patient follow-up. It is especially beneficial for rural or low-income populations, who often face significant barriers to accessing in-person services, and for promoting greater engagement and medication adherence, which are important factors for chronic disease management (Schwamm, 2017).

Telemedicine plays a decisive role in the military, especially in austere operating environment, where resources are limited and medical evacuation can be difficult or even impossible. It allows experts to provide medical care at a distance, improving clinical outcomes by reducing unnecessary evacuations and keeping service members active for a longer period of time (Asad; Nooresahar; Sabzwari, 2021; Pamplin, 2019). Pamplin (2019) describes a structured model of military telehealth specifically designed for austere and operational environments, in which the central objective is to bring specialized expertise to the point of need, reducing the cost and risk of unnecessary evacuations and increasing combat effectiveness by keeping military personnel operational for longer. In the United States, the Military Health System (MHS) has used telemedicine extensively, especially in deployment settings, with a significant increase in use between 2006 and 2018, notably for mental health purposes (Madsen; Banaag; Koehlmoos, 2021).

Teleophthalmology stands out as an indispensable resource for optimizing the quality, efficiency, and accessibility of eye care for military personnel, their beneficiaries, and allies around the world (Anthony, 2023). Teleconsultation applications tested in combat zones and military installations have responded in less than four minutes, shown return to active duty in over half the cases, and prevented unnecessary aeromedical evacuations (Chung, 2023, Gensheimer, 2020).

Pilot studies conducted in the Singapore Armed Forces showed that telemedicine can expand the response capacity in primary care safely, efficiently, and effectively (Tan, 2022). In the naval context, use of telemedicine during ongoing operations has generated cost savings by replacing treatments in foreign hospitals (Rozycki, 2021).

However, there are legal and ethical challenges associated with implementing telemedicine in the military, such as clearly defining medical liability and obtaining informed consent in a complex operational environment. These challenges require specific regulation to ensure the effectiveness and safety of telehealth support (Çetin; Yildirim; Türkmen, 2024). Military settings introduce additional complexities, including the coexistence of multiple legal jurisdictions and the imperative need to protect sensitive patient data (Nittari, 2022).

In short, telemedicine emerges as a valuable tool to improve medical care in combat environments, offering access to specialized care, promoting better clinical outcomes, and addressing ethical and legal challenges that need to be adequately managed for its effective implementation (Asad; Nooresahar; Sabzwari, 2021; Çetin; Yildirim; Türkmen, 2024). Adaptability of these technologies to different operational scenarios, from peacekeeping missions to combat operations and field exercises, underscores the potential of telemedicine to overcome the connectivity challenges inherent in austere and remote environments. The agile communication and sharing of critical clinical

information facilitated by telemedicine can significantly impact decision-making in emergency situations or with limited resources, optimizing response time and potentially improving clinical outcomes.

4 CLINICAL ASPECTS OF TELEMEDICINE USE IN THE BRAZILIAN ARMY

In the unique context of the Brazilian Army, implementation of telemedicine emerges as a strategic driver for optimizing the dynamics of healthcare in diverse operational scenarios. One of the fundamental pillars of this integration lies in the ability to facilitate efficient and secure remote communication between medical professionals deployed in field operations and healthcare teams distributed across a variety of geographic locations. In using modalities such as secure videoconferencing, encrypted messaging platforms, and remote monitoring systems with real-time feedback, one can establish a continuous and comprehensive monitoring system of the vital signs and clinical evolution of military personnel, promoting agile and appropriate interventions to meet immediate needs (Asad; Nooresahar; Sabzwari, 2021; Brazil, 2022).

Adoption of telemedicine within the Brazilian Army significantly contributes to maintaining high standards of quality and safety in the healthcare services provided to its members, ensuring continuity of care and integrated coordination among professionals working at multiple levels of care (Brasil, 2013; Lisboa, 2023).

Despite the obvious benefits, the control inherent in the virtual environment of telemedicine can, under certain circumstances, influence the dynamics of the physician-patient relation, potentially generating power imbalances. This complex situation raises important ethical questions related to the autonomy of military patients and respect for their fundamental rights, ranging from the demonstration of empathy and compassion by healthcare professionals to the trust the patient places in the physician responsible for their care—essential elements for an effective therapeutic relation (Asad *et al.*, 2021; Lisboa, 2023).

The privacy and confidentiality of health information in military environments present specific challenges, given the sensitive nature of the data and priorities of information security (Nittari, 2022; Zaganelli; Binda Filho, 2023). In the Brazilian context, Zaganelli and Binda Filho (2023) analyze the intersection between medical confidentiality and the General Data Protection Law (LGPD) in telemedicine practice, concluding that health data, due to their sensitive nature, are intrinsically linked to personality rights and require rigorous treatment to guarantee the privacy of the data subjects—and that any violation may incur administrative sanctions for the data controllers. Obtaining valid informed consent remotely in dynamic operational contexts requires clear processes adapted to potential communication limitations and the nature of military situations, ensuring that patients understand the risks and benefits of telemedicine care (Çetin; Yildirim; Türkmen, 2024). Additionally, issues of professional responsibility and jurisdiction in cases of cross-border telemedicine or in joint operations with forces from other countries require careful legal analysis and the definition of clear protocols (Çetin; Yildirim; Türkmen, 2024).

Another clinically relevant aspect for the Brazilian Army is the promotion of equitable access to health services, especially in remote and hard-to-reach regions where military operations are frequently conducted (Brasil, 2013; Lisboa, 2023).

Although specific literature on the implementation and clinical outcomes of telemedicine in the Brazilian Army may be limited, studies conducted in other military health systems and in similar contexts provide valuable insights. For example, research on the use of telemedicine in the armed forces of other countries has shown improvements in access to specialized care, reduced waiting times for consultations, and clinical outcomes comparable to those of in-person care in various areas, such as mental health (Madsen; Banaag; Koehlmoos, 2021) and primary care (Tan, 2022). Teleophthalmology exemplifies this potential well: mobile applications tested in combat zones and military installations showed specialized responses in less than four minutes, with a return to active duty in over half of the cases and prevention of unnecessary aeromedical evacuations (Chung, 2023; Gensheimer, 2020; Coccozza, 2020). The case reported by Coccozza (2020) is illustrative: ophthalmological teleconsultation in a combat environment in the Middle East allowed the proper diagnosis and management of a soldier with diplopia, avoiding an unnecessary aeromedical evacuation, with an expert response in less than six hours. In the naval context, telemedicine has expanded access to specialties such as otorhinolaryngology, with savings resulting from the replacement of treatments in foreign hospitals (Rozycki, 2021).

In summary, telemedicine presents itself as a tool with multiple opportunities for improving the delivery of clinical care within the Brazilian Army. However, its successful implementation requires a multifaceted approach that considers not only the clinical and operational benefits, but also the ethical, legal, and technological challenges specific to the military context, always prioritizing the quality, safety, and equity of care, and the preservation of the well-being and integrity of patients (Asad *et al.*, 2021; Brasil, 2022; Çetin; Yildirim; Türkmen, 2024).

5 ECONOMIC ASPECTS OF TELEMEDICINE USE IN THE BRAZILIAN ARMY

Strategic implementation of telemedicine by the Brazilian Army presents a promising outlook in terms of optimizing resource allocation and generating significant economic efficiencies. One of the most relevant aspects lies in the significant reduction in operating costs, traditionally associated with displacement of military personnel to consultations and hospital units. Availability of remote clinical care, mediated by ICTs, leads to a substantial decrease in transportation expenses, both for patients and healthcare providers, especially in geographically dispersed operational scenarios and in remote or hard-to-reach regions (Asad *et al.*, 2021; Brasil, 2013). This ability to provide care without the need for physical travel not only generates direct savings in fuel, vehicle maintenance, and daily expenses, but also minimizes the time military personnel are away from their operational activities, positively impacting operational productivity (Asad *et al.*, 2021; Lisbon, 2023).

Additionally, telemedicine shows considerable potential in preventing hospital readmissions. Continuous remote patient monitoring post-treatment facilitates the early identification

of warning signs and potential complications, allowing proactive interventions and avoiding the need for readmissions, which represent a significant portion of hospital costs (Brasil, 2013; Lisboa, 2023). By ensuring a more effective transition to post-hospital life and promoting closer monitoring, telemedicine contributes to the health and well-being of assisted military personnel while optimizing the utilization of hospital beds and reducing expenses associated with new admissions. Telehealth, in general, has shown a positive impact on post-consultation follow-up, increasing accessibility and convenience for patients (Kruse, 2023; Schwamm, 2017).

Use of telemedicine in the Brazilian Army also enhances the overall efficiency of health services, optimizing the allocation of available human and material resources. The ability to conduct medical consultations more quickly and remotely can reduce waiting times for both routine appointments and expert evaluations. By ensuring timely and affordable medical care, telemedicine contributes to reducing military downtime for health reasons, positively impacting operational productivity and personnel availability for missions (Asad *et al.*, 2021; Lisboa, 2023). Optimizing resource allocation is also evident in the possibility of concentrating experts in referral centers, remotely attending to a larger number of patients distributed across various units, avoiding the need for constant travel of highly qualified professionals and, consequently, generating cost savings (Rozycki, 2021).

Another significant economic benefit lies in minimizing costs related to maintaining physical infrastructure and acquiring expensive medical equipment. Telemedicine reduces the need to build and maintain complete physical medical facilities in remote regions or at temporary operational bases, where demand for health services can fluctuate. By enabling access to specialized care via digital platforms, the Brazilian Army can optimize its investments in health infrastructure, directing resources to modernizing referral centers and acquiring information and communication technologies (Brasil, 2022; Lisboa, 2023). This approach promotes more sustainable and efficient financial management for the military healthcare system in the long term, especially in naval contexts, where telemedicine avoids treatments in foreign hospitals, generating significant savings (Rozycki, 2021).

Finally, expanding the geographic reach of healthcare services via telemedicine allows for the care of a broader population base of military personnel and their dependents, without the economic burdens directly linked to the physical expansion of hospital facilities. This increase in healthcare coverage is especially relevant for remote or underdeveloped areas where traditional access to specialized medical care is limited (Asad *et al.*, 2021; Brasil, 2013). By overcoming geographical barriers, telemedicine contributes to equitable access to healthcare and improves the quality of life for military personnel and their families, without incurring the high costs associated with building and maintaining new healthcare facilities. This increased access also translates into greater adherence to treatment and follow-up, factors that are important for reducing costs in the long term (Schwamm, 2017). In regions with limited resources, telemedicine directly contributes by reducing transportation costs and expanding access to essential services, favoring treatment adherence and patient follow-up.

Thus, telemedicine plays a multifaceted strategic role in optimizing costs and improving the efficiency of the Brazilian Army healthcare system. Intelligent use of information technologies enables a significant reduction in logistical and structural costs while providing quality medical care comparable to that offered in large urban centers, aligned with the ethical and well-being principles of the military institution. A robust economic analysis of the benefits of telemedicine, including reduced operating costs, prevention of readmissions, increased efficiency, infrastructure optimization, and expanded geographic reach, reinforces its strategic value for the operability and sustainability of the Brazilian Army healthcare system. The ability of telemedicine to improve treatment adherence and post-consultation follow-up (Kruse, 2022; Schwamm, 2017), observed in various health contexts, also applies to the military environment, contributing to the effectiveness of treatments and reducing indirect costs associated with absenteeism and loss of productivity.

6 TELEMEDICINE AS A STRATEGIC TOOL FOR NATIONAL DEFENSE

Telemedicine, understood as a segment of ICTs focused on health, has been consolidated as a strategic tool for strengthening National Defense by expanding health services accessibility in remote regions and offering direct care support to military personnel and their dependents (Ressureição, 2017). Within defense, its relevance transcends the traditional care logic by contributing directly to supporting the elements of National Power—the Military, the Psychosocial Power and the dimension of Science, Technology and Innovation (Lourenço Filho, 2017).

Brazil's geographical reality, marked by vast extensions and hard-to-reach areas such as the Amazon, imposes significant logistical and specialized personnel limitations, which makes telemedicine an essential solution. Having the ability to provide specialized care at a distance, overcoming physical and structural barriers, strengthens the operational readiness of the Armed Forces and reduces the vulnerability of their personnel (Lourenço Filho, 2017; Reis; Carvalho; Santos, 2018). An emblematic example is the Telemedicine Neurosurgical Care project, implemented in 2018 by the Manaus Area Military Hospital (HMAM) in partnership with the São Paulo Area Military Hospital (HMASP), which allowed specialized evaluations and follow-ups even without the physical presence of neurosurgeons in the Western Amazon (Reis; Carvalho; Santos, 2018; Segobia, 2019).

Its impacts are not restricted to the clinical level. Resource savings resulting from the reduction of medical evacuations, displacements, and unnecessary hospitalizations are significant. In 2018, the Army Health Service estimated savings of R\$ 180,000.00 only with air tickets avoided thanks to the use of neurosurgical telemedicine (Reis; Carvalho; Santos, 2018). Additionally, employing professionals already working in the Military Health Organizations avoids additional costs with external hiring and contributes to reducing bureaucracy in logistical and administrative processes (Reis; Carvalho; Santos, 2018).

From an operational perspective, telemedicine offers several strategic benefits: it enhances the continued technical training of military health personnel, facilitates access to second expert

opinions—essential for quick decisions in the field—and optimizes the distribution of qualified human resources, especially in areas where retaining professionals is difficult (Lourenço Filho, 2017; Segobia, 2019). In military operations, field hospitals, and interagency missions, telemedicine enables remote support during the so-called “golden hour,” a decisive period for prognosis of the wounded, without exposing experts to unnecessary risks (Lourenço Filho, 2017; Segobia, 2019).

Installed technological infrastructure such as the Defense Operational Network (ROD), the EBNet network, and the Geostationary Defense and Communication Satellite (SGDC), provides a robust and secure basis for strategic digital communications between military units (Lourenço Filho, 2017; Segobia, 2019). Synergy between the ministries of Defense, Health and Science, Technology and Innovation is indispensable to boost innovation and integration of national capabilities in this field. Initiatives like the Connected Amazon project, associated with the SGDC, illustrate the potential for developing a unified telemedicine system for the three Forces, optimizing investments and strengthening technological sovereignty (Lourenço Filho, 2017).

Telemedicine within National Defense is a strategic lever for strengthening operational capacity, integrating the national territory, and promoting health as a vector of sovereignty. Its consolidation as a State policy allows military health to evolve in an autonomous, effective, and innovative manner by relying on science, technology, and institutional integration (Lourenço Filho, 2017; Segobia, 2019).

7 CONCLUSION

Incorporating telemedicine into military operations represents a significant milestone in military healthcare modernization by transforming the way in which care services are planned, organized, and delivered in remote or hard-to-reach environments. By means of diagnosis, continuous clinical monitoring, and remote therapeutic decision-making, with support from specialists located in urban centers or referral units, this technology contributes to expanding the reach and problem-solving capacity of healthcare, reducing dependence on local medical resources and optimizing clinical support at the tactical level.

Its effectiveness depends on the implementation of protocols and clinical guidelines adapted to the military context, associated with quality and security control mechanisms such as remote audits, case review, and the use of robust encryption and access control systems. Integration with interoperable electronic medical records and well-defined referral flows is essential to ensure continuity of care between the remote and in-person levels. These elements are indispensable to ensure safe, efficient care aligned with the normative requirements of the Defense.

However, using mediated technology requires technical preparation and sensitivity on the part of military health professionals given the complexities of the physician-patient relation in digital environments. Specific communication, training, and empathy strategies are key to

mitigating the power imbalances that can emerge in virtual interactions, especially when providing care in scenarios of high emotional tension like prolonged missions or conflict zones.

Additionally, the strategic use of ICTs offers a promising path to democratizing health services accessibility, especially for military and civilian populations located in peripheral areas. But achieving this potential requires facing structural challenges, including the scarcity of technological infrastructure in certain regions, the limited connectivity in remote units, and the variability in users' digital literacy level. In this regard, developing adapted technical solutions, such as low-bandwidth systems and offline functionalities, and providing continuous training to users are indispensable elements to ensure effectiveness and inclusion.

Our analysis of telemedicine implementation in the Brazilian Army reveals tangible benefits, both in the clinical and economic fields, following international trends in health systems modernization. Reduction of logistics costs, expansion of care coverage, rational use of specialized resources, and clinical decision support in the field are widely documented strategic advantages. However, consolidating this practice requires an ethical and proactive institutional stance focusing on protection of sensitive data, equity of access, and maintenance of quality of care.

In addition to operational aspects, institutionalizing telemedicine in the Brazilian Army depends on evidence systematization. Systematic collection and analysis of data on the use of this technology—including clinical outcomes, user satisfaction, and impact on operability—are key to guiding management decisions, assessing risks, and identifying priority areas for investment and innovation.

Telemedicine therefore emerges as an integrative solution capable of strengthening ties between the military and the health system, while promoting gains in efficiency, quality, and accessibility. Combining patient-centered care with the rational use of resources strengthens institutional trust and commitment to the troops' well-being. Such attributes are particularly relevant in an environment where treatment adherence and operational discipline determine the effectiveness of interventions.

It is necessary, however, to recognize its limitations and risks. Absence of physical contact can compromise diagnostic accuracy in certain situations, thus requiring robust clinical protocols and specialized training to mitigate failures and ensure patient safety. Technological, cultural, and legal barriers must also be addressed with doctrinal clarity and long-term strategies.

In conclusion, consolidating telemedicine as a strategic tool within the Brazilian Army requires an integrated approach involving technical training, technological innovation, specific regulation, and production of scientific evidence. International experience combined with the potential for national innovation offers promising paths for the Brazilian military health to position itself at the forefront of digital solutions, focusing on operational readiness, care equity, and technological sovereignty. Strengthening the competencies of army health professionals and fostering applied research will be decisive for a successful transformation.

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