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Telemedicine in Internal Medicine: A Review of Patient Outcomes, Physician Workload, and Healthcare System Efficiency

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ABSTRACT

Abstract. In recent years, advances in digital technology have brought about major changes in the way global healthcare services are delivered. The COVID-19 pandemic has accelerated the use of information technology in healthcare, including the use of telemedicine. In the field of internal medicine, which generally requires long-term management of chronic diseases, telemedicine offers the potential to expand the reach of services, improve efficiency, and maintain good clinical outcomes. The objective of this study is to narratively examine how telemedicine influences patient clinical outcomes, healthcare worker workload, and healthcare system efficiency in internal medicine practice. Through a literature review of the past five years, insights into the benefits and challenges of telemedicine implementation were obtained. The literature review included publications from PubMed, Scopus, and Web of Science databases from 2020 to 2025. Studies were selected based on topic relevance, contextual relevance to internal medicine, and availability of full-text articles published between 2020 and 2025. The results show that telemedicine has been proven to improve access to services, speed up response times, and reduce pressure on healthcare facilities. However, there is an increase in administrative burden for healthcare workers, necessitating adequate infrastructure support, flexible policies, and training for healthcare workers to ensure optimal implementation

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Key Message:

- Telemedicine has significantly improved access, response times, and reduced pressure on healthcare facilities in internal medicine during the COVID-19 era.
- Despite its benefits, telemedicine increases administrative workload, requiring infrastructure, flexible policies, and proper training for optimal implementation.

INTRODUCTION

Advances in information and communication technology have given rise to telemedicine as one of the main innovations in healthcare delivery, particularly in the field of internal medicine. Telemedicine enables medical services to be provided remotely

through integrated digital platforms, thereby expanding patient access to services and improving the efficiency of healthcare resource utilization (1).

The COVID-19 pandemic has accelerated the adoption of telemedicine worldwide. However, this transition has also brought new challenges, particularly regarding the quality of the patient-doctor relationship and increased workload for doctors outside of regular practice hours (2). On the other hand, several studies indicate that telemedicine can improve patient satisfaction and access, although its impact on clinical outcomes remains varied (3). Although the effectiveness of telemedicine has been extensively studied in primary care, systematic reviews highlighting its comprehensive impact in internal medicine practice, particularly regarding clinical outcomes, doctors' workload, and system efficiency, remain limited. The absence of standard protocols for its implementation among internal medicine specialists is also a critical issue that needs to be addressed (1)

A scoping review or narrative review is needed to summarize the latest scientific findings on the effectiveness and challenges of telemedicine implementation in internal medicine practice. Such a review can provide practical input for policymakers and hospital management in designing strategies for integrating digital services toward a sustainable healthcare system.

This study was conducted using a narrative literature review approach. Articles were searched through the PubMed, Scopus, and Web of Science databases for publications from 2020 to 2025, using the following keywords: “telemedicine,” “internal medicine,” “patient outcomes,” “physician workload,” and “healthcare efficiency.” The included studies were English-language articles relevant to the context of internal medicine practice and had full-text access. The selection process involved reviewing titles, abstracts, and article content. Data analysis was conducted qualitatively using a thematic approach to findings from each study.

METHOD

This review adopts a scoping review approach with a descriptive narrative format to explore how telemedicine is being used in internal medicine and what impact it has on clinical outcomes, the workload of healthcare providers, and the overall efficiency of health services. This method was chosen because it’s well-suited for examining research areas that are still evolving and where studies may use a variety of approaches. It also helps identify gaps in current knowledge and points toward potential topics for future research.

To gather relevant literature, a structured search was carried out across three major academic databases: PubMed, Scopus, and Web of Science. These platforms were selected because they are widely recognized and contain high-quality studies in medicine, healthcare systems, and digital health. The search focused on works published between 2020 and 2025, as this period reflects a critical surge in telemedicine adoption due to the COVID-19 pandemic. Keywords used included combinations like telemedicine, internal medicine, clinical outcomes, health system efficiency, and provider workload, arranged using Boolean operators (AND/OR) to fine-tune the search.

After collecting the initial set of articles, duplicates were removed and each entry was manually reviewed to exclude studies that were not relevant. The screening process happened in two stages: first by evaluating the titles and abstracts, and then by reading the full text of selected papers. Specific criteria were used to decide which studies to include or exclude.

Studies were included if they met the following criteria:
- Published between 2020 and 2025.
- Focused on telemedicine implementation or its effects within internal medicine specialties (e.g., cardiology, pulmonology, nephrology, endocrinology).
- Assessed outcomes related to patient care, healthcare worker burden, or system-wide efficiency.
- Available in full text, in English or Indonesian.
- Empirical in nature, including both quantitative (observational or experimental) and qualitative studies, as well as systematic reviews.

Studies were excluded if they:
- Were editorial pieces, opinion articles, or letters without original data.
- Focused on non-clinical disciplines or areas outside internal medicine (e.g., surgery or pediatrics).
- Discussed telemedicine primarily from a technical standpoint without linking it to clinical or system-level outcomes.

Articles that met the criteria were then analyzed thematically. Each study was categorized based on its core focus, whether it examined patient outcomes, healthcare provider experiences, or health system efficiency. The findings were synthesized into a cohesive narrative to provide a clearer picture of how telemedicine is shaping the practice of internal medicine in today’s healthcare environment.

RESULTS

A total of 1,602 articles were identified, and 6 studies were selected for further analysis based on topic relevance. The summary of findings is presented as follows:

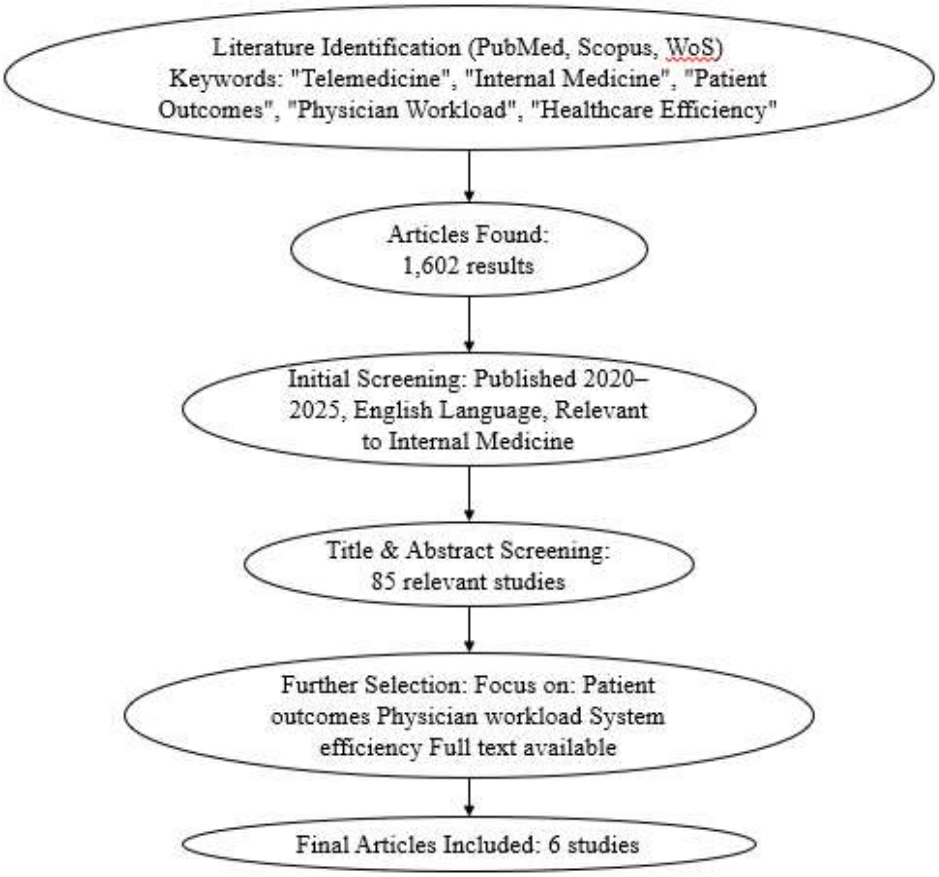

Figure 1. Search Framework

Table 1. Research Result

No.	Author (Year)	Type of Study	Research Method	Main Results
1.	Lawrence et al. (2022)	Quantitative survey	Survey of doctors regarding the use of EHR and telemedicine after the pandemic	Administrative workload increased due to digital documentation after working hours
2.	Pennington et al. (2022)	Observational study	Analysis of operational data from neurological hospitals before and after the implementation of telemedicine	Schedule efficiency improved, patient satisfaction was high, but surgical procedure yield decreased
3.	Tyazhelnikov, Polunina, Kostenko, & Polunin, (2021)	Clinical experience report	Descriptive study on telemedicine-based COVID-19 services in Russia	One doctor was able to handle up to 52 patients per shift using a digital triage protocol
4.	Pietrantonio et al. (2024)	Position paper & narrative	Literature review and expert opinion EFIM (European Federation of Internal Medicine)	Systemic policies and digital training are prerequisites for the success of telemedicine
5.	Ahmad Alshehri et al., (2024)	Systematic review	Systematic review of 38 studies on patient satisfaction and outcomes of telemedicine	Patients are satisfied with ease of access, but communication quality is perceived as lower
6.	Pappan, Austin, Bosah, Wedgeworth, & Venkat, (2023)	Observational study	Evaluation of outcomes for high-risk patients using telemedicine services	No increase in hospitalizations or emergency department visits; the service is deemed safe for this population

DISCUSSION

The results of the study indicate that telemedicine has a positive impact on internal medicine practice, particularly in

terms of system efficiency, service capacity, and patient safety. Pennington's note that online consultations can reduce waiting times and provide flexibility in scheduling, which supports the operational efficiency of healthcare services.[6] Additionally, Tyazhelnikov, Polunina, Kostenko, & Polunin demonstrate that a virtual shift-based work model can increase the number of patients treated without compromising the quality of clinical data (4).

The implementation of telemedicine also presents challenges, particularly regarding the workload of healthcare professionals. Lawrence reported an increase in work outside of practice hours due to the obligation to document in electronic health record systems and respond to patient messages online. This leads to the phenomenon of "work-after-work," which has the potential to disrupt the work-life balance and mental health of doctors (2).

From a policy and digital competency perspective, the importance of clear regulatory support and improved digital literacy among healthcare workers and patients to support sustainable implementation.[1] Meanwhile, Ahmad Alshehri et al. found that while patient satisfaction with telemedicine services is high, clinical communication quality has declined due to limited direct interaction (3).

Finally, patient safety is also a major concern. A study by Pappan et al, concluded that telemedicine remains safe to use even for high-risk patient groups, such as the elderly and those with severe comorbidities, provided there is an adequate monitoring system in place. Overall, these findings indicate that telemedicine has great potential in supporting internal medicine practice, but it must be balanced with adaptive policies, digital training, and attention to healthcare worker well-being to ensure optimal and sustainable implementation (5).

This review shows that the application of telemedicine in internal medicine practice has a significant impact on three main aspects: patient outcomes, healthcare worker workload, and system efficiency. Six selected articles from publications between 2020 and 2025 present diverse perspectives but show consistency in several key themes.

Clinical Outcomes and Service Accessibility

Most studies agree that telemedicine significantly expands access to healthcare services, particularly for patients with mobility challenges or residing in remote areas. In internal medicine practice, which often manages chronic conditions such as diabetes, hypertension, and pulmonary diseases.

A study by Ahmad Alshehri et al revealed that patients demonstrated high satisfaction with online consultation services. They felt they received adequate attention and clear therapeutic guidance without having to wait long at healthcare facilities.[3] This finding is supported by Pennington who reported that telemedicine helps reduce the number of missed appointments, as the flexibility of consultation times makes it easier for patients to attend. However, despite high patient satisfaction levels, some doctors stated that the limitations of direct interaction had a negative impact on the quality of physical examinations. This indicates that telemedicine is more appropriate for follow-up stages rather than for initial evaluations of complex conditions that require comprehensive physical examinations (6)(14) (15).

Doctors' Workload and Mental Health

Telemedicine offers flexibility, but it does not always reduce doctor's workload. recording consultations, handling patient messages, and arranging follow-ups online actually extend non-clinical working hours, especially outside of official practice hours. This phenomenon is known as "work-after-work" or hidden workload that is not formally recorded but impacts doctors' work-life balance and mental health.[2] The increase in asynchronous communication, such as electronic messages and hospital internal applications, creates pressure to always be responsive, which, according to Pietrantonio et al, risks causing digital fatigue and chronic stress if not supported by training in time management and professional communication boundaries.[1] Conversely, Tyazhelnikov in 2021 found that digital triage systems and administrative automation actually improve efficiency in remote practice. During the COVID-19 pandemic, a doctor was able to handle up to 52 patients per shift without compromising clinical data quality, thanks to the support of digital medical records and systematic communication flows.(4)(16)(17).

System Efficiency and Economic Benefits

System efficiency is an important aspect that is also influenced by the implementation of telemedicine. From an operational perspective, virtual services have been proven to reduce patient waiting times, speed up rescheduling processes, and reduce the need for physical facilities for routine examinations. Decrease in clinic operating costs and an increase in the utilization of healthcare workers' time. However, these findings are not entirely consistent. Some healthcare institutions report that while telemedicine is efficient in terms of time and logistics, the conversion rate from online consultations to medical procedures (such as surgical procedures or further interventions) has actually decreased. This suggests that telemedicine is more suitable for initial communication or monitoring chronic conditions, but is not yet ideal as the primary tool for making complex clinical decisions.(6)(18)(19)

Pappan et al evaluated the impact of telemedicine on high-risk patients, including the elderly and those with severe comorbidities. Their study results showed no increase in hospitalizations or emergency department visits due to online consultations, indicating that telemedicine remains safe for use in vulnerable populations, provided it is accompanied by adequate monitoring systems (5).

Regulation, Digital Literacy, and Policy Implementation

The success of telemedicine implementation is greatly influenced by external factors, including government regulations, healthcare institution policies, and the digital literacy levels of doctors and patients. Pietrantonio highlight that without clear policies regarding data protection, boundaries of online medical practice, and adequate incentive mechanisms, the use of telemedicine risks being unsustainable. They also recommend that medical education curricula include training on digital health and virtual communication skills (1).

Telemedicine is increasingly playing a crucial role in internal medicine practice, particularly in the management of chronic diseases. Remote monitoring has been shown to improve patient adherence to therapy and facilitate early detection of complications, especially in patients with heart failure and diabetes.[7] The use of digital technology and monitoring devices also enhances efficiency in patient monitoring, such as reducing service time and lowering visit costs. However, this approach has limitations, particularly in terms of direct physical examinations, which may reduce diagnostic accuracy in complex cases. Therefore, online consultations are considered more suitable for follow-ups than for initial assessments.[8] As a solution, many experts suggest a hybrid approach that combines in-person and online services (9).

For healthcare professionals, telemedicine offers flexibility in scheduling, but it can also lead to hidden additional workloads. Tasks such as responding to patient messages, compiling electronic medical records, and monitoring test results asynchronously often need to be done outside of regular working hours (2). Without proper time management training and boundaries, this situation has the potential to cause prolonged fatigue and digital stress.[10] Another challenge is the low digital literacy of some patients, particularly the elderly and those from lower-middle-income groups. Many of them are not yet accustomed to using devices or applications for online consultations.[11] Additionally, issues related to confidentiality and medical data protection remain a concern, especially when information is transmitted through digital platforms (12).

In the face of these challenges, telemedicine has proven effective in replacing in-person services during the COVID-19 pandemic. In a relatively short time, the use of digital health technology increased dramatically and became a mainstay of primary health care (13). This experience shows that with supportive policies, adequate digital training, and well-integrated systems, telemedicine has the potential to become a sustainable part of internal medicine practice.

On the other hand, the digital divide remains a significant obstacle. Elderly patients and those from economically disadvantaged backgrounds often face difficulties in operating telemedicine platforms. Therefore, this service cannot yet fully replace conventional methods but is more appropriately considered as complementary care rather than a complete replacement solution (20)(21).

Public Health Policy Implications

Telemedicine offers significant opportunities to expand access and improve the quality of healthcare services by enabling remote consultations, reducing costs and travel time, and supporting the management of chronic conditions as well as home-based care for older adults. A SWOT analysis by Pietrantonio et al. (2024), conducted using the Delphi method (July 2021–December 2023), highlights that telemedicine can enhance efficiency, shorten consultation times, reduce the need for travel, broaden access to medical services, and lower healthcare expenses (1). However, its implementation faces challenges such as the digital divide, including low digital literacy and difficulties in technology adoption among patients and caregivers, making education and digital literacy campaigns a key part of telemedicine policies. Other barriers include legal and ethical issues, such as data privacy, information security, and cross-border licensing. Furthermore, technical limitations at care points, insufficient regulatory support, and inadequate reimbursement structures remain obstacles. Therefore, effective policies should focus on strengthening e-health skills among healthcare workers, educating the public, improving infrastructure, establishing service standards, and implementing clear legal and ethical frameworks involving professional associations and stakeholders. Overall, telemedicine has the potential to become a vital component of a more inclusive and efficient public health system, but it requires comprehensive policies to address technological, legal, and ethical challenges.

CONCLUSION

Telemedicine in internal medicine practice has been proven to improve service efficiency, expand patient access, and provide a high level of satisfaction without increasing the risk for patients with severe conditions. However, its implementation still faces challenges, particularly related to increased administrative burdens for medical personnel and limitations in clinical communication without face-to-face interaction. To ensure optimal and sustainable implementation, digital training for healthcare workers, supportive work systems, and adaptive policies based on scientific evidence are required.

For further research, it is important to conduct more in-depth studies on the long-term impact of telemedicine on clinical outcomes, the experience of medical personnel in dealing with new workloads, and policy models that can strengthen the integration of digital services into the national health system.

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