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Impact of Telehealth on Chronic Disease Control: A Narrative Review

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Abstract

Background. With the continuous development of new technologies, especially digital technologies, the possibilities provided by telehealth continue to increase. Research shows that the use of telehealth tools can be successfully used for managing patients with chronic conditions.

Aim. As the number of chronic conditions within the world's population rises, their effect becomes evident in terms of lowering patients' quality of life and life expectancy. Telehealth can be an effective solution to this growing problem. This review is intended to examine the state-of-the-art studies in relation to the effect of telehealth on chronic disorder management, focusing mainly on clinical outcomes, quality of life, and healthcare costs.

Material and methods. We reviewed the available scientific literature in databases such as PubMed, Scopus, and Web of Science. We included original research studies, systematic reviews, and meta-analyses that examined the impact of telehealth technologies on the

management of patients with chronic diseases and were published in Polish or English between January 2020 and May 2026.

Results. From the cited literature, it is clear that the use of telehealth has shown effectiveness in managing chronic disease. Although positive results can be observed in the short-term control of diseases such as hypertension, heart failure, diabetes, asthma, and chronic obstructive pulmonary disease, the effects of long-term management are unknown.

Conclusions. This narrative review provides important insights regarding both the possible benefits and constraints of telehealth when managing chronic diseases. With the increasing use of telemedicine, it is vital to consider such difficulties and make sure that telehealth is accessible and efficient for all chronic patients.

Key words: Telehealth, Telemedicine, Remote monitoring, Telemonitoring, Teleconsultation, Chronic Disease.

1. Introduction

Chronic diseases (known as Noncommunicable diseases) are defined as medical conditions that last one year or above and require staying under constant medical supervision [1-2]. They affect people's lives by reducing quality of life, lowering life expectancy, and increasing vulnerability to psychological issues [1-3]. They are also leading drivers in annual health care costs [1]. The most common four groups of chronic conditions include cardiovascular diseases, chronic respiratory diseases, diabetes, and cancers [1-2]. Chronic conditions affect nearly three-quarters of the US population, with around half of them living with more than one condition [1]. Noncommunicable diseases are reported to account for 43 million deaths worldwide, of which 18 million are people under the age of 70 [2]. The risk factors of chronic disease include genetic factors, behavior, metabolism, environment, and socio-economic factors. [1-3].

The World Health Organization defines telehealth as the "delivery of health care services, where patients and providers are separated by distance. Telehealth uses information communication technology for the exchange of information for the diagnosis and treatment of diseases and injuries, research and evaluation, and for the continuing education of health

professionals” [4]. Teleconsultation, telediagnosis, telemonitoring, and tele-education can be used to provide healthcare services to patients who face difficulties due to distance to a healthcare facility or their disability [5-7]. Telemedicine can facilitate communication between patients and physicians through online chat, phone calls, remote follow-up visits, medication management, and symptom monitoring [8]. Remote Patient Monitoring uses wearable or implanted sensors to collect data on patients such as heart rate, blood pressure, and glucose levels, and enables this data to be transmitted in real-time to doctors, allowing for early detection of a deterioration in a patient's condition [9].

The main goal of this narrative review is to determine the impact of telemedicine on chronic disease control. How telemedicine interventions affect clinical outcomes in patients with chronic conditions compared to standard care. How does the use of telemedicine affect a patient's quality of life and life expectancy. What are the benefits of telemedicine for healthcare resources. We hypothesize that telemedicine is a valuable complement to standard care, leading to improvement of clinical outcomes in patients with chronic conditions, enhancing their quality of life and life expectancy, as well as reducing the use of healthcare resources.

2. Research materials and methods

The search of the literature was performed on 8th June 2026 using the PubMed, Scopus, and Web of Science databases. Search terms included combinations of the following keywords: “telemedicine”, “telemonitoring”, “remote monitoring”, “telehealth”, “teleconsultation”, “chronic disease”.

Inclusion criteria comprise original research studies, systematic reviews, and meta-analyses addressing the usage of telehealth technology in adult populations with chronic disease. Articles had to report effects on clinical outcomes or quality of life or life expectancy or healthcare resources, and were published from January 2020 to June 2026 in English or Polish.

Exclusion criteria included: articles focused on acute care or on the pediatric population; articles published before January 2020; conference abstracts, posters, or protocols without accompanying full-text results.

At first, titles and abstracts of all searched articles were reviewed to identify potential studies. Thereafter, the full text of the corresponding studies was evaluated by two independent reviewers.

As a narrative review, this article is subject to potential selection bias by the authors. No formal PRISMA protocol or quantitative meta-analysis was performed.

3. Research Results

3.1 Technologies in Telehealth for Chronic Disease Control

Telehealth includes various digital technologies that improve the remote management of chronic disease by collecting and analyzing health data collected remotely from patients.

Telemonitoring represents one ot the many types of telehealth and involves the collection, recording, and electronic transfer of data related to patients' health status from their locations to the healthcare professionals' sites [7, 10]. Sensors collect raw data from patients, which are then uploaded to secure cloud-based servers for storage and analysis by special medical software and clinical decision support systems, which also generate alerts to clinicians if certain health parameters exceed pre-established boundaries[9-10]. The main purpose of telemonitoring is to detect deterioration or exacerbation of the disease early, allowing for rapid clinical decision-making and preventing further deterioration that might otherwise require emergency care or hospitalization. [9-11]. Acquiring data from the patient can be done by either invasive or non-invasive approaches. The invasive monitoring requires the installation of some device inside the patient's body, such as continuous glucose monitors to provide real-time glucose levels in patients with diabetes, and cardiac implantable electronic devices for tracking heart activity to detect life-threatening arrhythmias [10, 12-17]. The range of equipment for non-invasive measurements includes blood pressure monitors, wearable smartwatches and wristbands used to detect arrhythmias or track core vital signs, weight scales used in heart failure management to monitor daily changes in body weight, which allow for early detection of fluid congestion, and smart inhalers tracking medication usage and giving feedback on inhalation technique [6, 12-19].

Teleconsultation is another core component of telehealth for chronic disease control, enabling real-time remote communication between patient and medical staff regardless of the distance between them. It enables remote appointments for patients who, for various reasons, are unable to attend the clinic but need a follow-up appointment, education meeting, assistance with medication adjustments, or troubleshooting equipment [5, 20-21]. Teleconsultation eliminates geographical barriers, allowing patients in remote or underserved

areas to access a wide range of expertise. It also reduces the financial burden and inconvenience of travel and time away from work for patients [10, 22-24].

Telediagnosis is a part of telehealth that uses technology to exchange medical data to make a diagnosis from a distance without the need for a direct, in-person clinical examination. It plays a key role in the management of chronic conditions, enabling early recognition of disease and timely clinical decisions despite geographical barriers [13]. On a healthcare system level, telediagnosis helps triage patients more effectively, reducing unnecessary hospital visits [9-10]. During the COVID-19 pandemic, telediagnosis was crucial in maintaining essential diagnostic services while minimizing the risk of cross-infection in hospitals [25].

Tele-education involves providing patients and their caregivers with health-related educational content, training on self-management of their health, and information about their disease through remote digital platforms. Patients and their caregivers can learn about their condition, what symptoms to watch for, when to seek help, and how to modify their lifestyle to better manage their condition or prevent developing new ones [26, 27]. Tele-education also equips patients with practical skills necessary to manage their condition, such as how to use a home blood pressure cuff or how to master proper inhaler technique [8].

mHealth refers to mobile devices such as smartphones, tablets, smartwatches, as well as the associated applications that support healthcare delivery, patient self-management and health monitoring. They can be used for self-management and monitoring, allowing patients to manually or automatically record biometric data such as heart rate, weight, blood pressure, blood glucose level, caloric intake, and physical activity [10, 14, 24]. Some applications help improve therapy adherence by sending automated notifications for medication schedules, upcoming clinical visits, and daily health tasks [14, 24]. Some advanced apps utilize algorithms to analyze patient's data and provide real-time personalized recommendations or clinical alerts [14]. mHealth platforms are providing access to educational materials such as videos or guidelines that help patients better understand their conditions [24].

3.2 Effectiveness of Telemedicine Across Chronic Conditions

3.2.1 Cardiovascular Diseases

Telehealth, which has been constantly evolving in recent years, can be effectively use for monitoring patients with hypertension. Automated SMS text reminders and mHealth apps

significantly improve medication adherence and compliance with lifestyle modifications [7,14]. Data collected via telemonitoring is more realistic, as the absence of medical staff eliminates the white coat syndrome [19]. Numerous meta-analyses consistently report that telemedicine leads to a reduction in systolic blood pressure [5,6, 23, 28] ranging from a mean difference of 2.42mmHg [6] to 6.72mmHg [5] compared to usual care after 6 months of intervention [5]. Impact on diastolic blood pressure is more variable. While some clinical trials show improvements [7, 14], several large-scale meta-analyses found no significant difference in diastolic blood pressure between telemedicine interventions and usual care [5, 23, 28]. Telemedicine intervention helps to reduce healthcare costs by reducing unnecessary face-to-face appointments and emergency department visits without increasing the workload of physicians [7, 11].

Telemedicine can also be successfully used to monitor the treatment of patients with heart failure. Particularly, the combination of telemonitoring and teleconsultation is associated with a reduction in the risk of cardiovascular death [13, 28], without reducing the risk of death from heart failure [10] but significantly reducing the risk of hospitalizations for cardiovascular causes, with risk reductions ranging from 29% [28] to 32% [10] in the short term. Telemonitoring using cardiac implantable electronic devices can detect hemodynamic congestion before clinical decompensation occurs [10, 13, 28], enabling the prevention of exacerbations. Remote patient monitoring is considered a cost-effective method of monitoring patients with heart failure, as reducing the number of hospital admissions reduces healthcare costs [13].

3.2.2 Chronic Respiratory Diseases

Telemedicine and digital health interventions help control respiratory diseases like asthma and COPD by allowing early detection of exacerbations, improving compliance to prescribed drugs, and increasing patient's self efficacy throught tools like smart inhalers, telemonitoring, and telerehabilitation [18, 30]. Telemonitoring allows tracking physiologic parameters such as oxygen saturation, respiratory rate, and FEV1/FVC ratio through home spirometry and pulse oximeters [18]. Early detection of changes in respiratory effort enables immediate intervention, which may reduce emergency department visits and hospital readmissions [10, 18]. Home-based programs using video-guided exercises are just as effective as in-person rehabilitation [17,18]. These programs result in marked improvements in exercise capacity, quality of life, and psychological well-being, and a reduction in dyspnea

[18, 30]. mHealth apps and web platforms offer automated alerts, symptom recorders, and educational content. These tools give patients the ability to manage exacerbations themselves, often with a personalized action plan [30].

Improving long-term adherence and monitoring of environmental triggers are the major focus in asthma control [10,18]. Telemedicine tools such as mHealth apps can be helpful in this regard, as they allow patients to track their symptoms and receive alerts about air pollution or the presence of inhaled allergens that could trigger an asthma attack [10, 18]. Smart inhalers have digital sensors that measure medication use and inhalation technique in real time. Studies have shown that they significantly improve medication adherence and are associated with a higher chance of achieving well-controlled asthma and fewer hospitalizations [18]. Certain inhalers can be connected through Bluetooth connection to mHealth applications that provide personalised feedback and reminders, helping to extend symptom-free days [10, 18].

3.2.3 Diabetes Mellitus

Telehealth, with its instruments, can help patients with diabetes manage their condition by continuously monitoring glucose levels, providing education on self-care and self-management, and improving adherence to medical advice [10,14]. Some glucometers and continuous glucose monitors offer the option of auto-uploading results to servers from where doctors can access and analyse them remotely. Mobile applications help patients monitor their carbohydrate intake, insulin doses, and physical activity. There are available apps that offer automated medication reminders and real-time alerts for hyperglycemia or hypoglycemia [14]. Telemedicine can offer patients a Diabetes Self-Management Education program through video or phone, and can troubleshoot medical equipment like insulin pumps and pens in real time [24]. The clinical effectiveness of telemedicine in diabetes management is primarily evaluated by its impact on glycemic markers. Meta-analyses show that telemedicine has a significant effect on HbA1c levels, with the greatest effects seen after 12 months of intervention [5]. Individual studies (eg, SMARTDiabetes trial) reported significantly better glycemic control compared with usual care [31]. Research shows that digital interventions can improve patient Quality of Life, emotional well-being, and life satisfaction. Patients using telehealth are better informed about their own condition, making it easier for them to manage it themselves. Diabetes, like many other chronic diseases, can lead to a lower quality of life and life expectancy. However, the suggested literature indicates that telemedicine can help

patients increase their life expectancy by enabling better monitoring, timely treatment of acute cases, and the avoidance of complications [14, 19, 24].

3.3. Challenges and barriers

Despite the continuous development of telehealth technology, it is not without various limitations that hinder its widespread use in patients struggling with chronic diseases. Some limitations result from psychological or cultural reasons and are related to the reluctance or distrust of some patients towards digital technologies or simply to the preference for direct contact with medical personnel [27, 33-34]. A momentous restriction that totally prevents telehealth from being used is the lack of access to necessary devices (eg, smartphones, computers), shortage of electricity, or limited internet coverage [17, 18, 20, 26-27]. A similarly significant limitation, especially affecting older people, those from rural areas, or those with lower education, is the difficulty in using digital devices or navigating online platforms [33-34]. The success of telemedicine interventions is highly dependent on continuous patient cooperation and compliance, which may be difficult to maintain in the long term, as many patients experience "user fatigue" due to the burden of daily, continuous self-monitoring, receiving alerts, or technical issues with the operation of devices or applications, resulting in a high rate of treatment abandonment in the long term 14, 22]. The use of technology requires training of not only the patients but also the health personnel, alongside a technical support unit that ensures its continued functionality [13, 22]. Remote technologies also have certain clinical limitations related to the inability of a physician to conduct a full physical examination, which may result in an increased rate of misdiagnosis [20, 34]. Implementation of telehealth services faces challenges as far as cybersecurity and privacy of personal information are concerned because of the significant amount of private information that the telehealth technologies could collect at once. As there is no technology that cannot be hacked, it is vital that there should be certain laws to safeguard against such vulnerabilities [14, 18, 26].

3.4 Future Directions and Implications

The intensive development of advanced artificial intelligence in recent years has opened up new possibilities for monitoring, treating, and educating patients with chronic diseases. Thanks to the access to huge medical databases, machine learning algorithms will be

able to better predict the occurrence of exacerbations in patients with chronic diseases, help patients better manage their disease, and support doctors in selecting more personalized treatment that will allow the patient to achieve greater benefits [9, 25, 26]. Artificial intelligence-powered chatbots will support patients by answering their questions about their disease or symptoms independently, as well as translating medical recommendations into a language tailored to the patient [9, 14]. Further development of devices used in telehealth is expected in the future, which will be even more convenient to use, more accurate, and more miniaturized [10, 12]. In the face of the growing number of people with chronic diseases and limited resources of medical staff, we can expect further development of virtual wards in the future, thanks to which patients can receive hospital-level care while staying at home [10].

3.5 Research Gaps

Because most published studies are short-term pilot or proof-of-concept studies with short follow-up periods, it is difficult to determine whether the initial clinical benefits of telehealth technologies can be sustained in the long term. Published results also lack scientific consistency in how interventions are designed, implemented, and evaluated, as different studies utilize different technology platforms, varying numbers of technologies, and differing outcome measures, making meta-analyses and drawing firm conclusions difficult. Since most of the research done thus far is about using telehealth as a supplementary treatment to conventional healthcare, there is a need for further research, particularly concerning telehealth as a complete replacement for face-to-face consultation. It would also be important to look at other illnesses in which telemedicine can play a role in their management, alongside looking at the use of telemedicine as a treatment tool for people suffering from several illnesses rather than just focusing on single illness treatment. There is also a lack of high-quality studies addressing the cost-effectiveness of wider implementation of telehealth tools, setting out long-term costs and potential savings from the perspective of patients, the healthcare system, and society as a whole.

4. Discussion

The increasing role played by telehealth requires clear recognition because it allows managing patients suffering from various chronic diseases, even when they live in rural areas, by overcoming distance and minimizing time and expense on transportation. Based on the

results of the examined articles, it can be stated that telemedicine interventions contribute to a decrease in systolic blood pressure, better glucose control among people suffering from diabetes, and a reduced chance of hospitalization or mortality related to cardiovascular risk among patients with heart failure. Telemedicine can also be useful in managing patients with respiratory disorders by helping early detection of exacerbations, ensuring better medication adherence, and improving patients' quality of life. However, we should not forget about the disadvantages associated with telehealth implementation, which include people's inability or reluctance to use this technique, lack of access to devices, technical issues with applications and devices, and possible cybersecurity concerns. Further research is therefore needed on the long-term effect of telehealth interventions and their cost-effectiveness, considering the fact that currently available literature is insufficient and does not fully cover these topics.

5. Conclusion

To conclude, this narrative review highlights critical insights into our current knowledge of telehealth, noting both its strengths and weaknesses. Although short-term evidence highlights the importance of such tools in managing people with chronic illnesses like diabetes, hypertension, heart failure, asthma, and chronic obstructive pulmonary disease, further studies are needed to shed light on their long-term implications.

Disclossure

All authors have read and approved the final version of the manuscript for publication.

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The authors declare no conflicts of interest.

Declaration of the Use of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this work, the authors used Grammarly for the purpose of language editing and grammar correction of the English text to improve readability and linguistic accuracy. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the substantive content of the publication.

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