STUDY PROTOCOL

Impact of digital health on the quality of primary care for people with chronic noncommunicable diseases: A scoping review protocol

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Abstract

Background

Chronic Non-Communicable Diseases (NCDs) represent a significant global challenge, especially in low- and middle-income countries. The introduction of digital health in Primary Health Care (PHC) has the potential to improve the quality of care for people with NCDs by offering tools such as telemedicine, mobile applications and other information and communication technologies. The aim of this study is to identify and map global experiences of using Information and Communication Technologies (ICTs) in primary care for non-communicable diseases and assess their impact on the quality of care in PHC.

Methods

This study presents a scoping review protocol based on the Joanna Briggs Institute criteria and the PRISMA-ScR guidelines. The review will be carried out in nine stages, including defining the aim and research questions, developing inclusion and exclusion criteria, and searching, selecting, extracting and analyzing the evidence. The databases consulted include MEDLINE/PubMed, JBI Evidence Synthesis and Open Science Framework.

Results

The review will identify and map global experiences in the use of ICTs in primary care for NCDs and assess their impact on the quality of care in PHC. It is hoped to find studies that address the use of digital technologies for early detection, management and follow-up of NCDs, as well as their integration with traditional health systems.

Abbreviations: AI, Artificial Intelligence; BVS, Virtual health library; CAPES, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior; DeCS, Health Sciences Descriptors; ETD, Electronic Theses and Dissertations; ICTs, Information and Communication Technologies; JBI, Joanna Briggs Institute; MeSH, Medical Subject Headings; NCDs, Chronic Non-Communicable Diseases; OSF, Open Science Framework; PCC, Population, Concept, and Context; PHC, Primary Health Care; PRISMA-ScR, Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews; SDS, Sustainable Development Goals; WHO, World Health Organization.

Conclusions

The integration of digital technologies into PHC has the potential to improve the quality of care, but it can also accentuate inequities. It is necessary to consider digital health literacy, access to tools, and legal and ethical aspects of data protection. The review will highlight the need for robust policies and adequate infrastructure to support the effective implementation of digital health in PHC.

Introduction

Chronic Non-Communicable Diseases (NCDs), including cardiovascular, chronic respiratory, and metabolic conditions, are major contributors to global morbidity and premature mortality, disproportionately impacting low- and middle-income countries [1, 2]. Addressing these challenges requires health systems to provide efficient, cost-effective care, with Primary Health Care (PHC) playing a critical role in care coordination [3, 4].

PHC is central to reducing premature NCDs mortality, aligning with the Sustainable Development Goals to improve accessibility, community focus, and comprehensive care [5, 6]. Since COVID-19, digital health has significantly expanded within PHC, enhancing the detection, management, and monitoring of NCDs. This integration of technologies such as mobile apps and telemedicine supports personalized, equitable health services, thereby strengthening the coordination of NCDs care [7, 8].

Digital health, as defined by the World Health Organization (WHO), encompasses Information and Communication Technologies (ICTs) applications like telemedicine, mHealth, health records, Artificial Intelligence, and more [9–11]. However, while promising, technology can also deepen inequities if factors like digital literacy, easy access to the necessary tools, legal and ethical aspects in protecting the data generated and, above all, the influence of the social determinants of health on the use of this technology are not addressed [12, 13].

An exploratory search was conducted from January to April 2024 using MEDLINE/PubMed, Open Science Framework (OSF), and Google Scholar with the terms "Noncommunicable Diseases," "Digital Health," and "Primary Health Care," combined with the Boolean operator AND. This search identified eight systematic reviews on topics including: telemedicine in diabetes care for middle- and low-income countries [14]; telemedicine applications in Chronic Obstructive Pulmonary Disease (COPD) [15]; smartphone applications targeting physical activity [16]; digital tools assessing functional capacity in patients with type 2 diabetes mellitus [17]; the application of Artificial Intelligence (AI) to enhance primary healthcare [18]; health professionals' perceptions of telehealth usability in primary care for NCDs patients [19]; quality of life analysis in asthma patients using interactive telehealth [20]; and users' perspectives on eHealth and mHealth services in lifestyle and NCDs prevention [21].

Achieng and Ogundaini [22] conducted a scoping review on digital health and chronic disease self-management in sub-Saharan Africa, exploring region-specific implementation challenges and benefits. Additionally, Xiong et al. [23] examined the impact of factors such as political commitment, interactivity, user-centered design.

Few studies have examined the long-term effects of digital health interventions, leaving a notable gap in understanding the sustainability of these solutions and the sustained adherence of patients with NCDs [24]. Additionally, integrating digital health technologies into traditional healthcare systems and achieving interoperability across various platforms remain frequent challenges [25]. Moreover, the reliance on technology raises concerns about

accessibility, particularly in regions with inconsistent internet connectivity or power supply, potentially exacerbating health disparities. Data privacy and security are also significant concerns, as the collection and storage of sensitive patient information can lead to mistrust in digital solutions if cybersecurity threats arise [26]. Furthermore, user experience plays a crucial role; poorly designed interfaces can discourage usage, leading to underutilization of these technologies and ultimately failing to achieve their intended impact [23]. Furthermore to the points already mentioned, the economic interests focused on digital health are currently concentrated in the hands of a few multinational technology corporations, mostly based in the Global North. These corporations exert enormous influence over research agendas, policies, infrastructures, and digital health technology implementations, which may limit access to the benefits of digital health for certain patient groups [26].

While existing evidence contributes significantly to evaluating digital technologies for NCDs care, studies no comprehensive scoping or systematic reviews were found that thoroughly explore the integration of digital health within national policies and systems, nor their impact on key PHC quality attributes—such as access, continuity, holistic care, management, community focus, family-centeredness, and cultural sensitivity [27], which are essential to NCDs management. Therefore, this protocol proposes a Scoping Review to identify and map digital health applications in primary care for NCDs and evaluate their impact on PHC quality.

The conceptual framework for quality will be grounded in Donabedian's model [28], which defines health quality through three interrelated components: structure, process, and outcome. The structure encompasses the physical, human, and organizational resources for healthcare delivery, including technological infrastructure, qualified professionals, and access to devices. The process involves the activities performed by healthcare professionals, focusing on the technical, organizational, and relational dimensions of digital care. Lastly, the outcome evaluates the effects of care on patients' and the community's health, assessing factors such as access, effectiveness, and patient satisfaction with the care received.

This review will emphasize the necessity for robust policies and adequate infrastructure to facilitate effective and sustainable digital health implementation in PHC. It will also highlight the significance of continuous innovations to enhance NCDs management.

Methods

This is a Scoping Review protocol based on the Joanna Briggs Institute (JBI) criteria, guided by the theoretical framework of Arksey and O'malley [29], with updates by Levac [30] and Peters [31], as well as the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) [32, 33].

For the organization of this study, a search was conducted in the MEDLINE/PubMed, JBI Evidence Synthesis, and Open Science Framework repositories, aiming to identify knowledge gaps and previous and/or ongoing reviews that are similar. No other identical study was found. This protocol was registered in the OSF [34].

To guide the study, nine steps will be developed as recommended by JBI [31, 35]. They are: Definition and alignment of the objective and question; development of inclusion criteria with the objective and questions; description and planning of the approach for evidence search, selection, data extraction, and presentation of evidence; evidence search; evidence selection; evidence extraction; evidence analysis; presentation of results; and summarizing the evidence in relation to the review objective, drawing conclusions, and noting any implications of the results. All steps are detailed below:

Define and align the objective and question

Definition of PCC.   Based on the definition of the PCC mnemonic (Population, Concept, and Context) [31], available in Table 1, the objective of the research question was defined.

Objective.   To identify and map global experiences of using ICTs in primary care for NCDs and to assess their impact on the quality of care in PHC.

Research questions.

i. Which countries use ICTs in the care of NCDs in PHC?

ii. What digital resources (applications, types, and tools) are used in the care, prevention, and promotion of health for people with NCDs in the scope of PHC?

iii. What is the impact of digital technologies on the quality of care for people with NCDs in PHC?

Definition of the concepts defined in the PCC.   The definition of the concepts used in this research is presented in Table 2.

Develop and align the inclusion criteria with the objective and questions

Inclusion criteria.   The following will be included: a) primary studies published in full; b) grey literature; c) theses, dissertations, and official documents (governmental and from health institutions or organizations).

The search criteria will have no restrictions on time and language, which is a key characteristic of a Scoping Review. The terms and descriptors used will focus on digital health, which will impose a temporal limitation on the topic. It should be noted that this is a recent topic, and the term "digital health" has become more commonly used following the publication of the Guideline Recommendations on Digital Interventions for Health System Strengthening [10].

Exclusion criteria.   Publications that will be excluded are duplicates, literature reviews, letters, book chapters, theoretical essays, editorials, abstracts and brief presentations, and expert opinions.

Description and planning of the approach for evidence search, selection, data extraction, and presentation of evidence

As per JBI guidelines [31], the search methodology follows three stages: exploratory search to identify potential uncontrolled search terms, keywords, and indexed descriptors. After identifying the descriptors and keywords, an initial exploratory search was conducted in the MEDLINE/PubMed to identify publications and, after reading the titles and abstracts, identify the most commonly used descriptors and keywords (Appendix 1 in S1 File).

Following the identification of the most commonly used terms, a librarian refined the search strategy using controlled vocabularies, namely: Health Sciences Descriptors (DeCS),

Table 1. Definition of the PCC mnemonic.

Mnemonic	Description
P[a]	People with NCDs
C[b]	Digital Health and quality of healthcare
C[c]	Primary Health Care

a–Population; b–Concept; c–Context.

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Table 2. Description of the concepts used in this research.

Concept	Description
People diagnosed with non-communicable diseases	People diagnosed with non-communicable diseases (NCDs), which are diseases that develop over a lifetime, are generally slow, silent, and asymptomatic, but can significantly affect the quality of life and pose serious risks to individuals. The most important NCDs include cardiovascular diseases, chronic respiratory diseases (bronchitis, asthma, rhinitis), hypertension, cancer, diabetes, and metabolic diseases (obesity, diabetes, dyslipidemia) [36].
Digital Health	Digital health is a broad, economical, and secure field that applies Information and Communication Technologies (ICTs), including remote health services (telehealth) and remote consultations (telemedicine, telenursing, among others). ICTs encompasses support from computers, mobile phones, the internet, videos, text messages, websites, platforms, information systems, electronic records; mobile health (mHealth); and emerging technologies such as big data, genomics, and artificial intelligence [10].
Healthcare	Healthcare is that which attends to, respects, welcomes, and helps people who suffer—primarily due to their social vulnerability—while ensuring quality and treatment of their problems. It is an integrated work resulting from the "relationships between people," meaning it is the product of positive interactions between users, professionals, and institutions [37].
Quality of Care	The quality of healthcare is the ability of services to improve desired health outcomes for individuals and populations, based on evidence-based knowledge. To be considered high-quality, healthcare must be effective, providing evidence-based services to those who need them; safe, avoiding harm to patients; and person-centered, addressing their preferences, needs, and values [38].
Evaluation of Care Quality	The quality of healthcare will be assessed using Donabedian's theoretical framework [28, 39] utilizing the following parameters:
	Structure: This pertains to physical resources, staff, and financial resources, as well as organizational structure, infrastructure, and normative and strategic resources (protocols, guidelines) that comprise the provision of healthcare.
	Process: These are the activities related to health care, involving the interaction between professionals and users. This component will be evaluated considering technical, organizational, and relational dimensions. Outcome: This refers to the direct changes in the health status of individuals and the community. To verify the outcomes of using digital health in primary care for people with NCDs, this study will evaluate the impact of ICTs on the essential attributes of PHC, which are first contact, longitudinality, comprehensiveness, and coordination of healthcare.

Source: Prepared by the author, 2024.

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Medical Subject Headings (MeSH), Entree (Embase), as well as text words and subject headings, in order to obtain a comprehensive strategy and refine the results [40]. The standard search strategy is provided in Appendix 2 in S2 File.

Search for evidence. The standardized search strategy will be applied to search for evidence in both white and grey literature and will be adapted for each database, using the Boolean operators "AND" and "OR" as needed. The complete strategy used in MEDLINE/PubMed is available in Table 3, tested on May 04, 2024, yielding a total of 1,546 results.

Data source. Data collection will be conducted from the following portals and databases: MEDLINE/PubMed, LILACS/virtual health library (BVS), Scopus, Web of Science, Embase, Cochrane, Epistemonikos, Google Scholar, Digital Library of Theses and Dissertations, CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior) Theses Portal, DART-E (European Electronic Theses and Dissertations (ETDs)—DART-Europe), ProQuest Dissertations & Theses Global. For Google Scholar, the selection will include the first 100 files

Table 3. Search strategy used in MEDLINE/PubMed.

PCC	TERMS
P	"Noncommunicable Diseases"[Mh] OR "Noncommunicable Disease*"[ti] OR "Non-infectious Diseases"[tiab] OR "Non infectious Diseases"[tiab] OR "Non-communicable Disease"[tiab] OR "Non-communicable Chronic Diseases"[tiab] OR "Chronic Disease, Non-communicable"[tiab] OR "Non communicable Chronic Diseases"[tiab] OR "Non-communicable Chronic Disease"[tiab] "Diabetes Mellitus"[Mh] OR Diabetes[title] OR Hypertension[Mh] OR "High Blood Pressure*"[tiab] OR Neoplasms[MH] OR Tumor*[ti] OR Cancer* [tiab] OR "Malignant Neoplasm"[tiab] OR "Benign Neoplasm"[tiab] OR "Cardiovascular Diseases"[Mh] OR "Cardiovascular Disease*"[ti] OR "Cardiac Event*"[tiab] OR "Adverse Cardiac Event*"[ti] OR Infarction[Mh] OR Infarct*[ti] OR "Myocardial Infarction"[Mh] OR "Myocardial Infarction*"[tiab] OR "Cardiovascular Stroke*"[tiab] OR "Heart Attack*"[tiab] OR Stroke[Mh] OR Stroke*[title] OR "Cerebrovascular Accident*"[ti] OR CVA[title] OR "Cerebral Stroke"[tiab] OR "Acute Cerebrovascular Accident*"[tiab] OR "Heart Diseases"[Mh] OR "Heart Disease*"[title] OR "Cardiac Disease*"[title] OR "Heart Disorder*"[title] OR Asthma[Mh] OR Asthmas[title] OR "Bronchial Asthma"[ti] OR "Pulmonary Disease, Chronic Obstructive"[Mh] OR "Pulmonary Disease, Chronic Obstructive"[tiab] OR "Chronic Obstructive Lung Disease"[tiab] OR COAD[ti] OR COPD[ti] OR "Airflow Obstruction, Chronic"[tiab]
	AND
C	(Ehealth[ti] OR e-Health[ti] OR telehealth[tiab] OR Telecare[tiab] OR mHealth[ti] OR Telerehabilitation [mh] OR Telereh*[ti] OR "home telehealth"[tiab] OR "Home telecare"[tiab] OR "virtual rehabilitation*"[tiab] OR telemonitoring[tiab] OR "telecare monitoring system"[tiab] OR telenursing[ti] OR "Digital Health"[tiab] OR "Digital Health Strateg*"[tiab] OR "Digital Health Interventions"[tiab] OR "eHealth Strategies and Policies"[tiab] OR Telemedicine[Mh] OR Telemed*[ti] OR "Virtual Medicine"[tiab] OR "information and communication Technolog*"[ti])
	AND
C	"Primary Health care"[Mh] OR "Primary Health*"[title] OR "Health Care, Primary"[tiab] OR "Primary Healthcare"[ti] OR "Primary Care"[tiab] OR "first line care"[tiab] OR "general practi*"[ti] OR "primary medical care"[ti] OR "primary care nursing"[tiab] OR "Community mental health*"[tiab] OR "Family medicine"[ti] OR "Family physician*"[ti] OR "Community health*"[ti] OR "Community nurs*"[tiab] OR "Community pharmac*"[tiab] OR "Preventive care"[tiab] OR "Prevention program*"[tiab] OR "Preventive service*"[tiab] OR "Preventive health"[tiab] OR "Health promotion"[tiab] OR "Family health program"[tiab] OR "Family health strategy"[tiab]
	TOTAL: 1,810 Results

Source: Prepared by the author, 2024.

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found, sorted by relevance [41]. After selecting documents from the data sources, they will be exported to the reference manager EndNote, which will be used for reference storage and removal of duplicates (documents retrieved more than once from searches in different databases).

Selection of evidence

Pilot test of selection.   Before the selection, a pilot test will be conducted to calibrate the reviewers, enabling greater accuracy in the selection of studies. This action will simulate the evidence selection process, where a sample of 25 articles will be independently analyzed by pairs to identify possible inconsistencies and the need for adaptation of the extraction form [31].

The extraction form (Appendix 3 in S3 File) will also be examined during the pilot test, where two team researchers will independently extract each evidence source according to the potential data items of interest, based on the PCC and the research question.

Pollock and colleagues [42] support that during the pilot test, scoping review authors should reflect on the following questions:

1. Was there anything missing from the extraction form?

2. Was there anything redundant included in the extraction form?

3. Was there anything in the extraction form that you did not understand or that could be clarified better?

4. How much time did it take you to extract the necessary information?

These points will help define the relevant data to be extracted and reach an agreement on doubts or conflicts. Thus, the instrument may be updated during the research to improve the sensitivity of evidence extraction [43].

Selection. The selection of studies will be based on the inclusion and exclusion criteria described above, as well as the research questions of this study. After selection, the articles used will be organized in the EndNote software, which will also identify possible duplicates [44]. The final sample of documents will be defined based on the critical reading of titles and abstracts by two independent reviewers (ISS and PBX), using the Rayyan software [45] for data organization, ensuring blinding of the reviewers, enabling the independent selection of evidence. In the event of conflicts in selection, these will be resolved by a third reviewer.

During the full-text reading stage, researchers should also pay attention to the reference lists of included studies, as these can be an additional source. If any reference is found that meets the inclusion criteria, it may be included in the sample after its reading and critical analysis.

Extraction of evidence

Organization of the form. An extraction form, available in Appendix 3 in S3 File, was developed by the authors, following the guidelines of Pollock and colleagues [42], adapted to the objective and research question of this review. *Microsoft Excel®* (version 17.0) will be used at this stage to organize the extraction of information in table format. The following information will be extracted from the final sample of included evidence: Principal author; Year of publication; Country/continent/region of publication; Type of study (primary research/evidence synthesis/discussion article/official document; quantitative/qualitative/mixed methods/ grey literature); Objective; Digital tool/intervention; Technology; Website; Application; or other digital tool; Purpose of use (control, screening, monitoring, reminder, consultation, etc.); Did the use of digital health impact the quality of healthcare in PHC positively/negatively?; Language of publication; Which NCDs was described?; Were any Social Determinants of Health mentioned? If so, which ones?

Analysis of evidence

This review study will present both quantitative and qualitative results. Quantitative data will be evaluated through simple descriptive statistics (absolute frequencies and percentages) using *Microsoft Excel®* (version 17.0) [42]. The mapping results of the countries and regions identified that use digital health interventions in the care of people with NCDs will be organized and presented on a world map, showing the percentage of publications from each country/region/ context, using the *MapChart software.*

The qualitative data analysis will be guided by the theoretical framework of Peters and Pollock [42, 43], who recommend using basic qualitative content analysis in scoping reviews. Open coding will be adopted to allocate concepts or characteristics into general categories [42, 43]. Scoping review studies should be guided by the three phases of qualitative content analysis [42], described by Elo and Kyngäs [46], which are: i) preparation, ii) organization, and iii) reporting.

The synthesis of evidence will be presented descriptively through tables, diagrams, and thematic maps for better visualization of the results [42]. A narrative summary will provide the mapped data and report how the results relate to the review's objective and questions

Presentation of results

The final report of this study will be guided by PRISMA-ScR [32], presenting the results in the form of charts, figures, or flowcharts.

Consultation with stakeholders. Stakeholders is the term used, in plural, to refer to the interested parties in the development of health research. It is becoming increasingly common as researchers, journal editors, and funders recognize the potential impact they have on the evidence produced [47].

During this stage, we will seek to share the preliminary results obtained, allowing stakeholders to understand and evaluate the uses and types of digital health tools used in the primary care of people with NCDs. Additionally, consulting with stakeholders will enable the authors to identify the best ways to disseminate the results and discuss how the study can help in the development of public health care policies [47]. In this way, we aim to encourage knowledge exchange, providing an opportunity to discuss new evidence or areas of research that may not have been addressed [30, 33]. In this research protocol, the sample of stakeholders will be intentionally selected using the snowball method, with 8 (eight) stakeholders: researcher (2), healthcare professional (2), technology developer (2), and people with NCDs (2), all with experience in the use of digital health aimed at primary care for people with NCDs.

Presentation of results: Summary of evidence in relation to the review objective, drawing conclusions, and noting any implications of the results. At this stage, a summary of the results related to the study objectives will be organized. Additionally, potential gaps will be identified based on the study results and stakeholder feedback, aiming to guide future studies on the topic. All the results and findings of the research will be presented in the scoping review that will be developed on the basis of this protocol. The results will be shared through a scientific article published in open access, and a summary of the main findings will be provided in dashboard format.

Ethical aspects

Although the scoping review does not require ethical approval, all ethical aspects for data analysis, stakeholder consultation, including the anonymity of the information shared, and data dissemination, will be duly evidenced and respected.

Results

The preparation of this protocol resulted in a complex and systematic search strategy, as recommended by PRISMA-ScR. The sample selection flow (Fig 1) shows the results obtained from different data sources, based on the search strategy proposed in this protocol. The complete flowchart containing all the stages of evidence synthesis will be available in the scoping review.
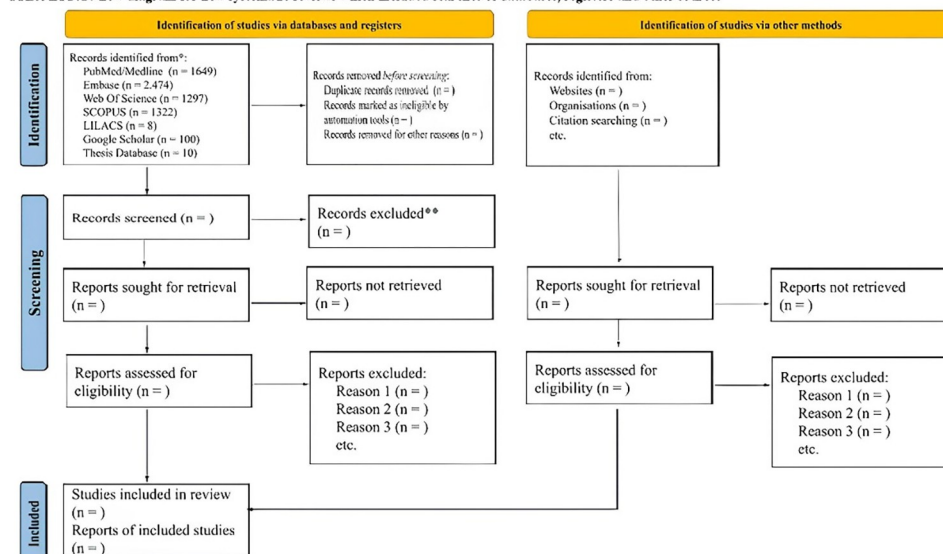
Discussion

Principal findings

The development of this scoping review protocol contributes to defining the objective and research questions. By previously defining the inclusion and exclusion criteria, search methods and analysis strategy, the protocol minimizes the risk of bias in the selection of studies and the interpretation of results [48, 49].

Technological and methodological advances in the management of NCDs indicate a significant shift towards personalized medicine and the integration of care [50]. Studies demonstrate the positive impact of digital technologies on patient education and the promotion of self-care, resulting in greater patient empowerment and better health management. This approach,

Fig 1. Sample selection flowchart. Source: Prepared by the authors, 2024.

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however, needs to be implemented carefully so as not to alienate patients with low access to technological devices [51].

Personalization of treatment is another key part of the findings, which argue that individualized management can lead to better outcomes. This suggests that healthcare professionals need to be willing to adapt their treatment plans according to the specific needs of each patient, a challenge that requires advanced clinical skills and adequate resources [50]. In addition, non-pharmacological interventions, such as physical exercise, should be considered essential components in the treatment strategy, as they can reduce dependence on medication and improve health outcomes [52].

Although the findings are promising, there are significant limitations that need to be addressed. Most of the observed studies are focused on specific populations, limiting the generalizability of the findings to other demographic groups [53]. In addition, many studies have not fully assessed the challenges of implementing these strategies in resource-limited settings, such as rural areas or developing countries. However, the results provide a solid basis for the development of future studies that can explore personalized and integrated interventions more broadly [54].

Thus, the construction of this manuscript is based on the need to guide a serious scoping review. This protocol strengthens the organization of the review process, transparency and replicability, defining clear steps and deadlines for compliance. This facilitates the management of time and resources, increasing the efficiency of the research team. In addition, scoping reviews with well-designed protocols contribute to the identification and synthesis of a wide range of evidence, providing a comprehensive view of a topic and identifying gaps in the existing literature [35, 49, 55].

Limitations

There are challenges typical of scoping reviews, such as the heterogeneity of the studies and difficulties in defining quality criteria. To minimize these, the inclusion and exclusion criteria

have been rigorously defined. In addition, software will be used to identify duplicate texts, and a team of 3 researchers, specialized in the methodology and theme, will conduct the selection and analysis of the studies. Involving stakeholders in the presentation of results can be a challenge, as they may be biased in their interpretation of the results, placing more emphasis on one finding than another. To overcome this challenge, stakeholders will have access to the objective of the study, its methodology and its main findings, and guiding questions will guide the stakeholders' assessment, preventing them from straying from the theme.

Difficulties related to the object of study, digital health, arising from the variability in definition in the literature and capturing the complex interactions between technologies, health professionals and patients, were also addressed. To this end, a clear concept of digital health drawn up by the WHO was adopted, guiding and delimiting the themes of the studies to be selected. As a possible gap and possibility for future studies, it would be relevant to develop primary research that seeks to explore the use of digital health in different cultural contexts, applicability, health practices and community health realities around the world. Considering that the model linking structure, process and results makes it easier to identify the interface of technologies and analyze their impact on health. Recognizing that new studies may be published during the collection period, it is proposed that the searches be updated during the data extraction and analysis stage.

Strengths

This protocol stands out for its solid theoretical basis related to quality applied to digital health and for its methodology that follows scientifically validated guidelines. Consultation with stakeholders is a crucial point in guaranteeing the relevance, applicability and impact of the results. In this way, it helps to identify research priorities, understand the results in health management practice and indicate ways to effectively implement evidence-based interventions. The findings of the scoping review will present a comprehensive mapping of how ICTs can improve the quality of life of patients with NCDs, offering continuous and personalized support; identifying strategies to increase autonomy and self-management of chronic diseases by patients.

Conclusion

In summary, this scoping review protocol represents a significant effort to investigate the impact of digital technologies on the management of NCDs in PHC. This work presents a robust theoretical basis and rigorous methodology aligned with scientific guidelines, and is useful for conducting a review that explores and synthesizes a diverse corpus of evidence.

The strategic inclusion of stakeholders will reinforce the relevance and applicability of the results, guiding health policies and clinical practices based on solid evidence. We recognize the inherent challenges, such as the heterogeneity of the studies and the issues in defining quality criteria, and we are committed to addressing them with methodological rigor.

Supporting information

S1 File. Appendix 1.
(PDF)

S2 File. Appendix 2.
(PDF)

S3 File. Appendix 3.
(PDF)

S4 File. Checklist_PRISMA-P.
(PDF)

Acknowledgments

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