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Leprosy health technologies in Primary Health Care: a scoping review

Tecnologias em saúde da hanseníase no âmbito da Atenção Primária à Saúde: revisão de escopo

Tecnologías en salud de la lepra en el ámbito de la Atención Primaria a la Salud: revisión del alcance

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ABSTRACT

Objective: to map health technologies for managing the care of people with leprosy in Primary Health Care. **Method:** scoping review based on the JBI methodology in six databases, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews checklist. Studies published in any language were included, with different methodological approaches. **Results:** the 14 studies included in the review show that the applicability of technologies for the management of care for people with leprosy in Primary Health Care makes it possible to confirm diagnosis, follow-up, monitoring, and prevention of disabilities. **Conclusion:** it has been noted that health technologies are tools that help in the process of caring for people with leprosy, to provide health professionals with knowledge about the disease, improving quality of health practice.

Descriptors: Primary Health Care; Leprosy; Technology; Information Technology.

RESUMO

Objetivo: mapear as tecnologias em saúde para manejo no cuidado à pessoa com hanseníase na Atenção Primária à Saúde. **Método:** revisão de escopo baseada na metodologia do JBI, em seis bases de dados, seguindo a *checklist Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews*. Foram incluídos estudos publicados em qualquer idioma, com diferentes abordagens metodológicas. **Resultados:** os 14 estudos incluídos na revisão mostram que a aplicabilidade de tecnologias para o manejo do cuidado a pessoa com hanseníase na Atenção Primária à Saúde, possibilitam a confirmação de diagnóstico, acompanhamento, monitoramento e prevenção de incapacidades**. Conclusão:** nota-se que tecnologia em saúde se apresentam como ferramentas que auxiliam no processo de cuidado na assistência a pessoas com hanseníase, a fim de permitir aos profissionais de saúde conhecimento sobre a doença, proporcionando qualidade na sua prática de saúde.

Descritores: Atenção Primária à Saúde; Hanseníase; Tecnologia; Tecnologia da Informação.

RESUMEN

Objetivo: mapear las tecnologías en salud para el manejo en el cuidado a la persona con lepra en la Atención Primaria a la Salud. **Método:** revisión del alcance basada en la metodología del JBI, en seis bases de datos, siguiendo la *checklist Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews*. Se han incluido estudios publicados en cualquier idioma, con diferentes enfoques metodológicos. **Resultados:** los 14 estudios incluidos en la revisión muestran que la aplicabilidad de tecnologías para el manejo del cuidado a la persona con lepra en la Atención Primaria a la Salud posibilita la confirmación de diagnóstico, seguimiento, monitoreo y prevención de incapacidades**. Conclusión:** se percibe que las tecnologías en salud se presentan como herramientas que ayudan en el proceso de cuidado en la asistencia a personas con lepra, con fines de permitir a los profesionales de salud el acceso al conocimiento sobre la enfermedad, proporcionando calidad en su práctica de salud.

Descriptores: Atención Primaria de Salud; Lepra; Tecnología; Tecnología de la Información.

INTRODUCTION

Leprosy is an ancient chronic disease with a major impact on public health due to its endemic nature throughout Brazil. Caused by the bacillus *Mycobacterium Leprae* with a tropism for peripheral nerve cells, it can cause disabilities and deformities. Its clinical condition is primarily defined by the appearance of lesions and spots on the skin with various morphoneurological characteristics, which can be hypochromic or brownish, with or without infiltrates, with hypoanesthesia or anesthesia being aspects belonging to any presentation[1].

Leprosy is an endemic disease in the state of Ceará and has great incapacitating potential. It should be noted that from 2014 to 2017, 7,006 new cases were reported in Ceará, where five municipalities are classified as hyperendemic because they have around 40 cases per 100,000 inhabitants, with the southern region of Ceará being the most critical of all[2].

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The new Digital Information and Communication Technologies enable the transmission and distribution of information through hardware, software, telecommunications, broadcasting, and optoelectronics. They enable new paths in health care, both in care management and in health and health education practices, as they bring the patient closer to the professional, contributing to the effective management of their problems in a meaningful and transformative way[3].

In recent years, with technological developments, the concept of technology has evolved, as has the use of new resources in healthcare practices. Thus, technologies seen as objects and instruments are important work components, but they should not be restricted to mere tools, since they establish shared relationships between subjects, in a mutual knowledge exchange[4].

In this context, technologies are taking off in various relational fields. In health, both printed and audio-visual formats have been on the rise in recent years. In the context of neglected diseases, specifically leprosy, it is believed that this technological format can contribute to the professional who deals directly with people affected by the disease and thus improve the endemic panorama of the condition, both in early diagnosis and in preventing disabilities and encouraging self-care.

The aim is therefore to map the evidence on the use of technologies for the care of people with leprosy in Primary Health Care (PHC).

METHOD

The study is a scoping review guided by the recommendations of the Joanna Briggs Institute Reviewer's Manual (JBI), developed through five stages, namely: formulation of the research question; identification of relevant studies; selection of studies; extraction and analysis of data; synthesis; and preparation of the report. The research protocol was registered with the Open Science Framework (OSF), DOI: 10.17605/OSF.IO/7EPM3 (https://osf.io/7epm3/) and follows the Preferred Reporting Items for Systematic reviews and Meta- Analyses extension for Scoping Reviews (PRISMA-ScR)[5,6].

The mnemonic strategy Population, Context and Concept (PCC) was used, as proposed by the JBI. The following determinants of interest to the study were defined: Population (P): people affected by leprosy; Concept (C): health technologies; Context (C): primary health care (PHC). Based on the PCC strategy, the following guiding question was drawn up for the review: What and how are health technologies used to manage leprosy in PHC? Adults over the age of 18 were considered to participate.

The article search process was carried out on May 10, 2023, in the Medical Literature and Retrieval System Online (MEDLINE) databases, via PubMed; Scopus (Elsevier); Web of Science (Clarivate); and the Latin American and Caribbean Health Sciences Literature (LILACS) and Nursing Database (BDENF) through the Virtual Health Library (VHL). Access to the paywalled databases was via the *Portal de Periódicos* of the Coordination for the Improvement of Higher Education Personnel (CAPES), using remote access via the Federated Academic Community (CAFe). The gray literature was retrieved from the Ministry of Health website.

Controlled descriptors from the Medical Subject Headings (MeSH), Emtree and Descriptors in Health Sciences (DeCS) databases were used. A specific strategy was defined for each search source, with the terms combined with Boolean operators "AND" and "OR". Figure 1 shows the advanced search strategies in the respective databases.

Databases	Search strategy
MEDLINE (via PubMed)	((leprosy OR "hansen disease") AND ("information technology" OR "information and communication technology" OR health)) AND ("primary health care" OR "primary care")
SCOPUS	(ALL (leprosy OR "hansen disease") AND ALL ("information technology" OR "information and communication technology") AND ALL ("primary health care" OR "ambulatory care" OR "primary care" OR health OR care))
WEB of SCIENCE	leprosy OR “hansen disease” (All Fields) AND “information technology” OR “information and communication technology” OR health (All Fields) AND “primary health care” OR “ambulatory care” OR “primary care” (All Fields)
LILACS (via VHL)	leprosy OR “hansen disease” [Palavras] and “information technology” OR “information and communication technology” OR health [Palavras] and “primary health care” OR care
BDENF (via VHL)	leprosy OR “hansen disease” AND “information technology” OR “information and communication technology” OR health AND “primary health care” OR “ambulatory care” OR “primary care” OR health OR care
Ministry of Health website	leprosy OR “hansen disease” AND “information technology” OR “information and communication technology” OR health AND “primary health care” OR “ambulatory care” OR “primary care” OR health OR care

Figure 1: Search strategy for document retrieval. Fortaleza, CE, Brazil, 2023.

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Studies published in full in English, Portuguese, or Spanish were included, as well as studies that dealt with the use of technologies involving printed or digital booklets, folders, the Internet, television, computers, and mobile devices such as smartphones and tablets (m-learning), among others. Repeated studies, recruitment notices, catalog records, and studies in different language not established for this study were excluded. It is important to point out that no time limit was imposed.

The results obtained from the databases were exported to the Rayyan® reference manager, created by the Qatar Computing Research Institute (QCRI)[7] to remove duplicates, select, and screen the studies and the articles selected from each database were imported into the BibTex file format. The data selection process was carried out by independent double checking using Microsoft Excel® spreadsheets.

Initially, the title and abstract of the studies were read, followed by a full reading of the studies included, considering the selection criteria. For data extraction, an adaptation of the form recommended by the JBI was used to facilitate the synthesis of information and recommendations. The following variables were selected for extraction: publication data (title, month and year, authors, journal, and country of publication); study object and/or question and/or objectives; methodological characteristics (type of study/design; instruments and/or data production techniques; participants and/or sample); main results (measurement of outcomes and main findings or contributions); and description of technologies (type, application, professional who applied the technology, easiness, difficulties); main results; and conclusions.

RESULTS

According to the electronic search, a total of 1,089 potentially eligible studies were identified in the databases, and 127 documents were removed due to duplicates. After reading the title and abstract, the pair of reviewers excluded 1,048 documents; 41 articles were read and analyzed in full. After applying the exclusion criteria, 14 articles made up the final review sample (Figure 2).

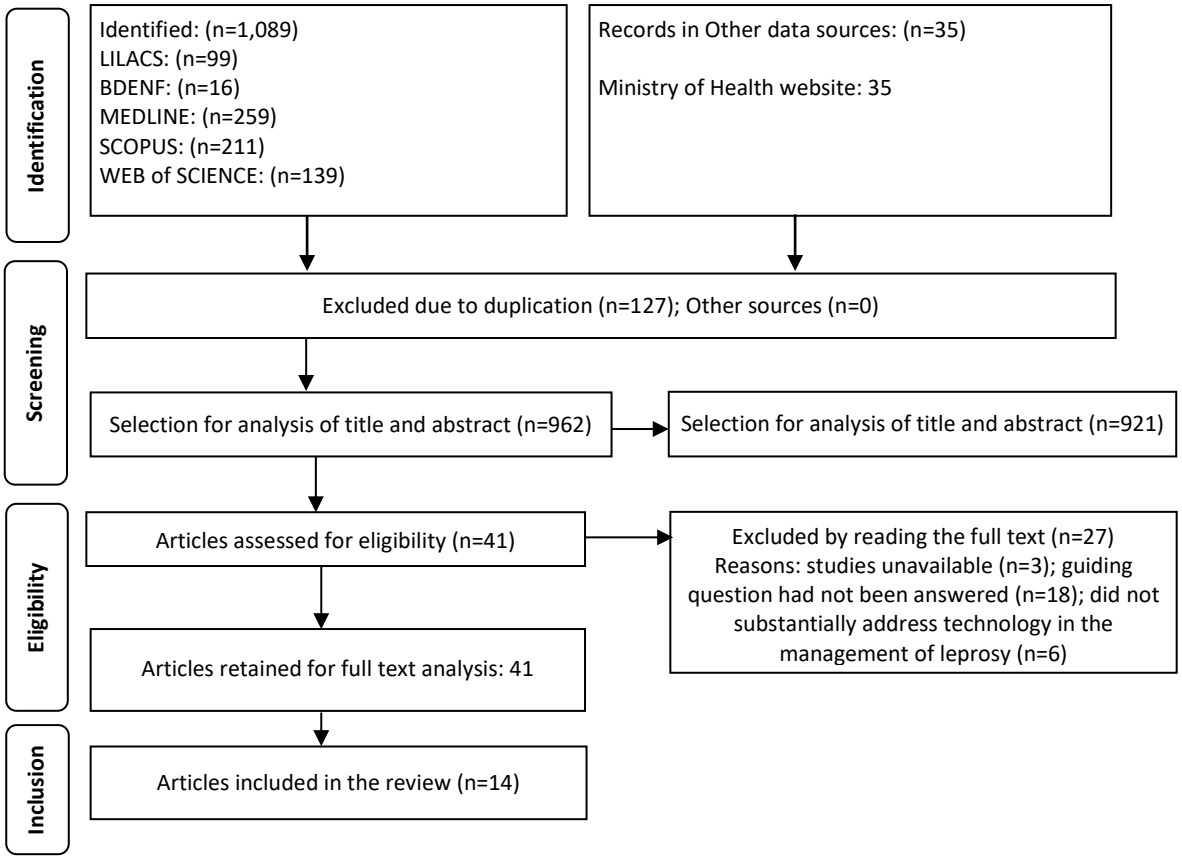

Figure 2: Flowchart of the selection of publications for scoping review according to PRISMA-ScR recommendations. Fortaleza, Ceará, Brazil, 2023.

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As for the year, four studies were published in 2020, which dealt with technologies for caring of people with leprosy, followed by 2008 (n=3), and 2009, 2014, and 2021 (n=2). In terms of language, most of the publications were in English.

Among the countries in which the research was carried out, Brazil stood out with (n=5) articles, Indonesia with two studies, India, Switzerland, South Africa, and North Korea were responsible for one publication per country. The type of studies were experience reports (n=3), reviews (n=3), descriptive study (n=1), cross-sectional study (n=1), methodological study (n=2), qualitative study (n=1), longitudinal study (n=1), quasi-experimental study (n=1), and observational study (n=1).

The main results, design and technologies used in the management of leprosy in Primary Health Care are presented in Figure 3.

*ID	Identified technology	Main results	Study design
1.	Nursing consultation instruments called "New Case" (CN) and "Follow-up Consultation" (CS)[1]	Instruments provide a comprehensive approach to leprosy patients during nursing consultations.	Descriptive study
2.	Leprosy Suspicion Questionnaire (LSQ)	LSQ is a low-cost, highly effective tool for promoting health education for health professionals on the neurological symptoms of leprosy.	Quasi-experimental study
3.	*e-Leprosy*	e-Leprosy app provides SMS messages on leprosy case notification and has the potential to improve care management.	Longitudinal with two groups of participants
4.	e-hanseníase[1]	*e-hanseníase* app provides information on treatment and has proven to be effective.	Observational study
5.	Posters and brochures	The use of posters and leaflets on leprosy was effective in educational practices to promote awareness of leprosy care.	Qualitative/interviews
6.	Instrument for evaluating the performance of Primary Health Care services in carrying out leprosy control actions from the users' perspective	The instrument made it possible to evaluate the performance of Primary Health Care in terms of the care and guidance provided by the health team.	Methodological study
7.	Instrument for evaluating the performance of primary care in leprosy control actions - community health agents' version	The tool aims to evaluate the performance of Primary Health Care in leprosy control.	Methodological study
8.	Nursing Consultation Instrument for Clients with Leprosy	The study showed that the Nursing Consultation Tool for Clients with Leprosy detects clinical needs and offers support for interventions and treatment.	Experience report
9.	Algorithms (AI)	Algorithms for the treatment of skin diseases, especially leprosy.	Review study
10.	AI (Karigiri)[1]	Karigiri technology can prevent maximum plantar pressure in anesthetic feet.	Experience report
11.	*m-Health*	Mobile health interventions enable rapid data collection, easy monitoring and supervision of data reports, better management of leprosy and other skin diseases, promoting interventions and appropriate treatment.	Systematic review
12.	AI (diagnosis)	The "Diagnosis" technology has a Convolutional Neural Network-based architecture for recognizing leprosy lesions.	Experience report
13.	Teledermatology (TDP)	The tools for TDP include videoconferencing, store and forward, hybrid, mobile, satellite communication, integration model, teledermatology.	Review study
14.	Telemedicine	Use of telemedicine to diagnose and treat patients from a remote location.	Transversal study

*ID=Identification; [1]Where indicated, the original names and/or acronyms in Portuguese were kept.
Figure 3: Summary of articles included, main results, design and digital technologies identified in caring of people with leprosy. Fortaleza, Ceará, Brazil, 2023.

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DISCUSSION

Technologies for the management of care for people with leprosy in PHC are presented in the literature as technologies to be used for identification and diagnostic confirmation, follow-up and monitoring consultations and care to prevent disabilities. The technologies are divided into instruments for consultation[8-10], instruments for evaluating service performance[11,12], mobile applications[13-15], printed educational technologies[16], artificial intelligence[17,18], and telehealth[19,20].

In this study, the instruments for nursing consultations are divided into new case consultations and follow-up consultations. These help in the comprehensive care of people with leprosy[9], detecting needs and offering support in interventions and treatment follow-up[8]. Thus, the use of specific instruments in nursing care is a measure to control leprosy in PHC[21].

Moreover, the use of these tools to improve professional performance has been shown[10]. Technologies aimed at learning about leprosy for health professionals are an innovative strategy that contributes to knowledge about caring for people with leprosy, acting directly on the gap in the training of these professionals[22].

As for the instruments for evaluating the service performance, there is the possibility of evaluating the performance of the PHC team in providing guidance and care for people with leprosy. Understanding the performance of PHC in the management of leprosy, based on identifying its relationship with the community and the difficulties in managing it, is essential for effective control of the disease[11,12]. Thus, the key role of PHC in leprosy control actions should be highlighted, considering the relevance of identifying weaknesses and the importance of critically analyzing the possibilities and potential of the team's actions when prioritizing its epidemiological scenario. In this way, it becomes possible to implement strategies to improve this performance by knowing the professional needs and training[22].

The literature has shown that apps have been used to notify new cases, monitor them, and provide messages about treatment, proving to be effective[13,14]. Mobile applications are recognized and well accepted by the population, given their significant contribution to health care, in the processes of prevention, promotion, assistance, and monitoring, bringing benefits to people, their families, and health professionals[23].

Regarding printed educational technologies, posters and leaflets are used to provide guidance on caring for people with leprosy[5]. This type of technology is an important health-promoting tool and can be used to facilitate access to information, as an innovative resource for the teaching-learning process in health education actions and to help communication between professionals and people with leprosy[24].

These printed educational technologies help health professionals communicate with the population, making it easier to provide information in a simple, attractive, and dynamic way. They are thus accessible, low cost, and effective, and can be used in all health services to provide the population with knowledge about the disease, treatment, and prevention of disabilities, helping to ensure comprehensive care[25,26].

Artificial intelligence can be used to prevent, recognize, and treat disabilities caused by leprosy[17,18]. Artificial intelligence can revolutionize the health sector by transforming care, diagnosis, research, and data management, thus improving the quality of care, equity in access to health care and optimizing aspects of management[27].

Artificial intelligence techniques for the health sector have contributed to decision-making and the recognition of trends and patterns. When it comes to caring for people with leprosy, artificial intelligence has been used to analyze epidemiological data on leprosy, making it possible to identify patterns that improve cure rates, reduce cases of treatment abandonment, and consequently reduce the number of deaths[28].

Telehealth is a tool that can be used in a hybrid or totally remote way, through the use of videoconferencing for the diagnosis and treatment of people with leprosy[19,20]. It should be noted that in the Brazilian context, the use of Telehealth is being perfected, and was perceived as a solution during the Covid-19 pandemic as a support for meeting the demand due to mandatory social isolation[22].

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Thus, telehealth is an important tool that can also be used for continuing education and ensuring professional qualification. Given the geographical size of the country and the particularities of each territory, coupled with social inequalities, telehealth allows knowledge and experiences to be shared, helping to qualify care and professional training in the various territories[29].

This mapping of scientific evidence on technologies and their use in the management of care for people with leprosy in PHC can help implement these technologies in the practice of health services, such as tools to help with consultations or service evaluation, apps, printed educational technologies, artificial intelligence, and telehealth.

Limitaciones del estudio

Regarding limitations, we highlight the smaller number of studies with more robust designs, which are considered to have a higher methodological quality.

CONCLUSION

The evidence from this review shows which technologies and how they are used to manage the care of people with leprosy in PHC. The technologies included tools, applications, artificial intelligence, telehealth and printed educational technologies being used for longitudinal care, from diagnostic confirmation, follow-up, monitoring, and prevention of disabilities, while no technologies were identified for health promotion in its broader context. Thus, it was clear that the technologies are used as essential measures to control leprosy. Among their main contributions, the technologies make it possible to identify the needs and weaknesses of care, leading to reflection on the possibilities for qualified action. It also helps the health professional communicate with the person and the community, facilitates access to knowledge about the disease, improving professional performance and qualifying care.

Therefore, technologies are revealed as tools that help health professionals work and dialog with the community in the care management for people with leprosy. Thus, the daily use of these technologies in health services facilitates decision-making on the best actions and has the capacity to improve access and promote equity.

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