

Educational technologies on tuberculosis for health professionals: a scoping review protocol

Tecnologias educacionais sobre tuberculose para profissionais da saúde: protocolo de revisão de escopo

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ABSTRACT

Objective: To map educational technologies on tuberculosis targeted at physicians, nurses, nursing technicians, and community health agents. **Method:** A scoping review protocol was developed following the approach of the Joanna Briggs Institute. The research question posed was: what are the educational technologies on tuberculosis for health professionals? Two independent reviewers will participate in the study selection process, which will involve assessing titles and abstracts based on established eligibility criteria. The search results and study selection process will be displayed using the *Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews* (PRISMA-ScR) flowchart. The reviewers will utilize a data extraction tool in the form of a spreadsheet in Microsoft Excel. Data will be analyzed and presented in tables, charts, and flowcharts to facilitate result visualization. The protocol has been registered on the Open Science Framework (OSF): <https://osf.io/va8pz/>.

Descriptors: Tuberculosis; Educational Technology; Health Personnel.

RESUMO

Objetivo: Mapear as tecnologias educacionais sobre tuberculose direcionadas a médicos, enfermeiros, técnicos em enfermagem e agentes comunitários de saúde. **Método:** Protocolo de revisão de escopo elaborado conforme a abordagem do Instituto Joanna Briggs (JBI). A questão de pesquisa elencada foi: quais são as tecnologias educacionais sobre tuberculose para profissionais da saúde? Dois revisores independentes participarão da seleção dos estudos, cuja avaliação ocorrerá com a leitura dos títulos e resumos, seguindo os critérios de elegibilidade estabelecidos. Os resultados da busca e do processo de seleção de estudos serão exibidos no fluxograma *Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews* (PRISMA-ScR). Será utilizada uma ferramenta de extração de dados desenvolvida pelos revisores, em forma de planilha no Microsoft Excel. Os dados serão analisados e apresentados em tabelas, quadros e fluxogramas, facilitando a visualização dos resultados. Protocolo registrado na plataforma Open Science Framework (OSF): <https://osf.io/va8pz/>.

Descritores: Tuberculose; Tecnologia Educacional; Pessoal de Saúde.

INTRODUCTION

Tuberculosis (TB) is an infectious disease that continues to be a major cause of health problems and mortality globally. While TB was considered the leading cause of death by a single infectious agent until 2019, control measures had been yielding positive results. However, since 2020, progress in reducing the disease has been hampered, stalled, or even reversed due to the focus on the COVID-19 pandemic⁽¹⁾.

Projections suggest that the incidence of TB may increase globally between 2022 and 2023. This scenario reflects the impact of disruptions in essential TB services during the pandemic, such as a decline in the number of diagnosed and reported cases⁽¹⁻²⁾, highlighting a context that demands attention. Therefore, it is currently considered a priority to restore access to and provision of essential TB services⁽¹⁾.

In this context, early and adequate diagnosis of cases is one of the fundamental pillars for TB control, as it allows for timely initiation of treatment,

aiming to achieve disease cure. In this regard, healthcare professionals play a crucial role in TB care processes⁽³⁾, and the training of human resources is considered vital, as it can be a decisive factor for quality care, but conversely, it remains one of the major challenges and prevailing problems in TB control⁽⁴⁾.

It is inferred that educational and technological resources can be employed to improve TB care. The literature reveals various Educational Technologies (ET) on TB that are being developed and utilized, focusing on professionals and students in the healthcare field, aiming to promote education and learning among this target audience⁽⁵⁻⁶⁾. ET, in turn, consists of a systematic set of scientific knowledge⁽⁷⁾, representing one of the ways to promote individual development. Furthermore, they are defined as new teaching strategies, research, concepts, and ways of promoting education updates, enabling innovative ways of knowledge exchange, contributing to the learning process of those involved, and advancing education⁽⁸⁾.

It is worth noting that this study aligns with the United Nations' Sustainable Development Goals (SDGs), which include eradicating TB by 2030, advocating for increased health funding, and recruiting, developing, and training healthcare professionals⁽⁹⁾. Additionally, guidelines from the World Health Organization (WHO), in line with the SDGs, emphasize that the formation and training of healthcare professionals in TB are crucial measures for preventing and controlling the disease⁽¹⁰⁾.

Therefore, the importance of mapping different ET used in the education of healthcare professionals about TB is justified. Furthermore, it represents an opportunity to understand the utilization of these technologies and their outcomes in practice, as well as the probable influence on reducing TB rates. Additionally, it allows for an assessment of which types of educational measures were considered more suitable and effective in specific health contexts.

Preliminary search

It was identified that primary studies on the topic have been published. In order to map existing protocols and scoping and/or systematic reviews, a preliminary search was conducted in the following data sources International Prospective Register of Systematic Reviews (PROSPERO), JBI Evidence Synthesis, Open Science Framework (OSF), Cochrane Database of Systematic Reviews

e Medical Literature Analysis and Retrieval System Online (MEDLINE/PUBMED).

Two reviews were mapped in PubMed. A scoping review, with the objective of summarizing research on the use of digital technologies to improve TB care and control between the years 2016 and 2019⁽¹¹⁾, as well as a systematic review that evaluated the use of information and communication technologies in continuing education on TB⁽¹²⁾. In JBI, a systematic review protocol analyzed the most effective educational interventions to improve healthcare professionals' attention to patients by enhancing their specific knowledge about the Directly Observed Therapy of Tuberculosis and Directly Observed Therapy Short-Course (DOTS)⁽¹³⁾. Finally, in PROSPERO, a systematic review protocol addressed ET aimed at primary healthcare nurses on multidrug-resistant TB⁽¹⁴⁾.

Given the above, this scoping review differs from the protocols above and studies as it focuses specifically on the professional categories of physicians, nurses, nursing technicians, and community health agents, intending to map all types of educational technologies applied or developed in TB care contexts.

Therefore, this study aims to map educational technologies on tuberculosis targeted at physicians, nurses, nursing technicians, and community health agents.

METHOD

This is a scoping review protocol conducted following the approach of the Joanna Briggs Institute (JBI). Developing a review protocol is a fundamental characteristic of high-quality reviews, as it aims to guide the study, minimize biases, and ensure transparency in the process⁽¹⁵⁾. Protocol registered on the platform OSF: <https://osf.io/va8pz/>.

Scoping reviews are structured in five stages: 1. formulation of the review question; 2. identification of studies of interest; 3. selection of references; 4. organization and analysis of the extracted data and 5. synthesis and presentation of the results⁽¹⁵⁾. It should be emphasized that the present study, because it is a protocol, will not report the development of all the aforementioned steps.

It is recommended to use the acronym PCC (Participants, Concept and Context) for conducting scoping reviews, which should guide the development of the review question. The PCC that will drive this study and the research question, are described in Figure 1.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist will be followed to ensure the quality and transparency of the study's reporting⁽¹⁶⁾.

Eligibility criteria

Participants

Studies with a target population of healthcare professionals, specifically physicians, nurses, nursing technicians, and Community Health Agents (CHAs), will be included. As these professionals are directly involved in providing care to TB patients within a multidisciplinary team, they require constant educational updates to enhance their knowledge about the disease.

Concept

The review will consider studies involving Educational Technologies (ET) on TB for the target population's education. Both dependent and independent ET will be included. Dependent technologies rely on electronic resources for their utilization and/or production, such as computers, television, cell phones, videos, the internet, and related tools. On the other hand, independent technologies do not rely on electronic resources for their utilization and/or production, including items such as posters, booklets, serial albums, leaflets, brochures, manuals, guides, comics, newspapers, textbooks, and notice boards⁽⁸⁾. It is worth noting that both validated and non-validated technologies will be considered.

Context

Studies developed in healthcare services that form part of the TB patient care network will be

included, such as primary healthcare services, hospital units, and specialized services or outpatient clinics⁽³⁾, while also not excluding other healthcare contexts if ET of interest is found to be employed in those settings.

Types of evidence sources

This study will consider articles with primary qualitative, quantitative, or mixed data. Among them, experimental and quasi-experimental studies will be included. Randomized and non-randomized controlled trials, before-and-after studies, interrupted time series studies, and analytical observational studies, including prospective and retrospective cohort and case-control studies, will also be considered. Additionally, systematic reviews and studies from theses and dissertations will be included.

Data will be collected from the following information sources: MEDLINE, PubMed Central/NLM, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Academic Search Premier, and Academic Source from EBSCO; Scopus and Embase/Elsevier; Web of Science/Clarivate Analytics; Educational Resources Information Centre (ERIC); Latin American and Caribbean Health Sciences Literature (LILACS), Nursing Database (BDENF), Virtual Health Library (BVS); and Scientific Electronic Library Online (SciELO). Google Scholar and the Catalog of Theses and Dissertations from the Coordination for the Improvement of Higher Education Personnel (CAPES) will also be considered.

Furthermore, studies in Portuguese, English, or Spanish will be included. The time frame for the study will be from 2001 to 2022, considering the publication of the first global plan titled "Stop

Acronym	Participants (P)	Concept (C)	Context (C)
Meaning	Health care workers for people with tuberculosis: physicians, nurses, licensed practical nurses and community health worker.	Educational technologies for TB teaching.	Health services that make up the tuberculosis care network: primary health care services, hospitals and specialized services or outpatient clinics.
Review question based on the acronym PCC.	What are the educational technologies on tuberculosis for health care workers?		

Figure 1 – Elements of interest of the study and review question according to PCC - Participants (P), Concept (C) and context (C). Santa Maria, RS, Brazil, 2023

TB⁽¹⁷⁾ in 2001, which set the central goal of eliminating TB as a public health problem.

Search strategy

As recommended by JBI⁽¹⁵⁾, the search strategy will be conducted in three stages. The first stage involves identifying keywords and index terms. In the second stage, the identified terms will be structured into a comprehensive search strategy, which will be adapted for each database and information source searched.

The search strategy for the PubMed, held on February 24, 2023, is described in Figure 2. Terms from the Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH) will be combined using the Boolean operators AND and OR.

In the third stage, the references of all included studies will be reviewed to identify additional studies to be included in the final scoping review.

Selection of evidence

All references will be grouped and uploaded to EndNote to remove duplicates. Then, the references will be exported to the Intelligent Systematic Review Software (Rayyan) for the management of the selection process. Two independent reviewers will participate in the study selection process, evaluating titles and abstracts according to the established eligibility criteria. Potentially relevant references will be read in full and evaluated in detail. Reasons for excluding full-text articles will be recorded and reported

Acronym	Search Strategy	Results
P	"Health Personnel"[mh] OR "Health Personnel"[tiab] OR Health Care Provider*[tiab] OR Healthcare Provider*[tiab] OR Healthcare Worker*[tiab] OR Health Care Professional*[tiab] OR Health Professional*[tiab] OR "Physicians"[mh] OR physician*[tiab] OR "Nurses"[mh] OR Nurse*[tiab] OR "Nursing"[mh] OR Nursing*[tiab] OR Medical Staff*[tiab] OR "health worker"[tiab] OR "clinical work"[tiab] OR doctor*[tiab] OR "Medical Staff"[mh] OR "Hospital staff"[tiab] OR "health worker"[tiab] OR "clinical work"[tiab] OR hospitality worker*[tiab] OR "hospital workers"[tiab] OR "staff working"[tiab] OR "Professional Practice"[mh] OR Professional Practice*[tiab] OR "Patient Care Management"[mh] OR "Delivery of Health Care"[mh] OR "Patient Care Management"[tiab] OR "Delivery of Health Care"[tiab] OR "Community Based Distribution"[tiab] OR "Health Care" OR Healthcare[tiab] OR "Licensed Practical Nurses"[mh] OR "Licensed Practical Nurse"[tiab] OR Licensed Vocational Nurse*[tiab] OR "Community Health Workers"[mh] OR "Community Health Workers"[tiab] OR "community Health Aide"[tiab] OR "Community Health Aides"[tiab] OR "Community Health Worker"[tiab] OR "Family Planning Personnel"[tiab] OR "Village Health Worker"[tiab]	3,287,189
C	"Tuberculosis"[mh] OR Tuberculosis[tiab] OR "Koch Disease"[tiab] OR "Koch's Disease"[tiab] OR "Mycobacterium tuberculosis Infection"[tiab] OR "Mycobacterium tuberculosis Infections"[tiab] OR Tuberculoses[tiab]	272,080
C	((("Health Education"[mh] OR "Health Education"[tiab] OR Education[mh] OR Educational[tiab] OR Literacy Program*[tiab] OR Training[tiab] OR Workshop*[tiab] OR Teaching[mh] OR Teaching[tiab] OR Pedagogies[tiab] OR Pedagogy[tiab])) AND (Tecnology[tiab] technological[tiab] OR technologies[tiab] OR "Health Strategies"[tiab] OR Strategies[tiab])) OR "Educational Technology"[mh] OR "Educational Technology"[tiab:~2] OR Instructional Technolog*[tiab] OR "health fairs"[tiab] OR "health science education"[tiab] OR "health sciences education"[tiab] OR "educational technology to support"[tiab] OR "educative technology"[tiab:~2] OR "Education, Continuing"[mh] OR "Continuing Education"[tiab] OR "Continuous Learning"[tiab] OR "Life-Long Learning"[tiab] OR "Lifelong Learning"[tiab] OR "Education, Distance"[mh] OR Cyberlearning[tiab] OR "Distance Education"[tiab] OR "Distance Learning"[tiab] OR eLearning [tiab]OR Tele-Education[tiab] OR Online Education*[tiab] OR "Online Learning"[tiab] OR Tele-Education[tiab] OR Teletraining[tiab] OR "Inservice Training" OR "Employee Orientation" OR "On the Job Training" OR "On-the-Job Training"	311,222
Time frame	2001:2022[pdat]	21,062,606
Language	english[Filter] OR portuguese[Filter] OR spanish[Filter]	
TOTAL		369

Figure 2 – Search Strategy for the PUBMED, stratified according to each elemento of the acronym PCC. Santa Maria, RS, Brazil, 2023

Code	Title					
Characterization of studies						
Authors	Journal	Year	Country	Language	Objective	Method
Participants and Context						
Participants			Context			
Caracterização das TE						
Type of TE	Resource	Objective of TE	Instructional content	Development	Usability	
Length of time	Validated?	Contributions	Difficulties	Before and after knowledge	Suggestions of the study	

Figure 3 – Instrument developed for data extraction. Santa Maria, RS, Brazil, 2023

at the end. The process of including studies will be fully reported and presented in a PRISMA-ScR flowchart⁽¹⁶⁾. If there are disagreements between reviewers, a third reviewer with expertise in the study's topic will be consulted.

Data extraction

A data extraction tool in the form of an Excel spreadsheet developed by the reviewers will be used to assist in the extraction and organization of relevant data. The tool will undergo a pilot test to train the reviewers and may undergo modifications throughout the process, which will be detailed in the final review. Relevant data from included studies will be extracted by two or more reviewers. If appropriate and necessary, authors of articles will be contacted to request additional data. The extracted data will include details about the study characterization, population, concept, and context in which the ET was developed and

applied. The information in the data extraction table is detailed in Figure 3.

Presentation of results

In this phase, the extracted data will be analyzed and presented descriptively through tables, graphs, and/or diagrams. A narrative summary will describe how the results relate to the review's objective and question.

*Paper extracted from the master's dissertation "Educational technologies on tuberculosis for health professionals: scoping review", presented to the Federal University of Santa Maria, Santa Maria, RS, Brazil.

CONFLICT OF INTERESTS

The authors have declared that there is no conflict of interests.

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