Educational technologies used to teach foreign body airway clearance in children: scoping review protocol

Tecnologias educacionais utilizadas para o ensino de desobstrução das vias aéreas por corpo estranho em crianças: protocolo de revisão de escopo

Tecnologías educativas utilizadas para enseñar la limpieza de las vías respiratorias de cuerpos extraños en niños: protocolo de revisión del alcance

Andressa Silva Carneiro de Souza[1], *Bruno Miguel Borges de Sousa Magalhães*[2], *Vitor Manuel Costa Pereira Rodrigues*[3], *Márcia Maria Carneiro Oliveira*[4]

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1. Federal University of Bahia. Saviour. Salvador, Bahia, Brazil. https://orcid.org/0000-0002-2907-907X

2. University of Trás-os-Montes and Alto Douro. Portugal. https://orcid.org/0000-0001-6049-8646

3. University of Trás-os-Montes and Alto Douro. Portugal. https://orcid.org/0000-0002-2795-685X

4. Federal University of Bahia. Saviour. Salvador, Bahia, Brazil. https://orcid.org/0000-0003-2294-0872

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RESUMO

Objetivo: mapear as tecnologias educacionais utilizadas para o ensino de desobstrução das vias aéreas por corpo estranho em crianças. Método: Trata-se de um protocolo de revisão de escopo construído baseado no método de revisão proposto pelo Joanna Briggs Institute (JBI) e registrado no Open Science Framework. A questão de pesquisa foi construída através da estratégia PCC, que inclui como elementos fundamentais as siglas mnemônicas: P -Problema (Desobstrução das vias aéreas por corpo estranho), C- Conceito (Tecnologias educacionais), C- Contexto (1. Saúde da Criança 2. Serviços de saúde infantil). Serão incluídas todas as categorias de artigo que atendam ao objetivo, sem restrição de idiomas, anos ou país e serão excluídos resumos em anais de eventos, artigos incompletos, artigos duplicados e que não abordem a temática. Serão utilizadas as seguintes fontes de dados: MEDLINE/ Pubmed, SCIELO, SCOPUS, EMBASE, Biblioteca Virtual em Saúde (BVS), Director of open access journals, Web of Science, The National Library of Australia Trobe (TROVE), CAPES (Catálogo de Teses e Dissertações), Cumulative Index to Nursing and Allied Health Literature (CINALH). Inicialmente será realizada a seleção dos estudos através dos títulos e resumos das referências identificadas através da ferramenta Rayyan QCR. Resultados: Serão apresentados em formas de quadro, fluxograma e figura. Conclusões: Este estudo fornecerá evidências das principais tecnologias educacionais utilizadas para o ensino de desobstrução das vias aéreas por corpo estranho em crianças.

Descritores: Tecnologia educacional; Criança; Manobra de heimlich; Materiais de ensino; Educação em Saúde.

ABSTRACT

Objective: to map the educational technologies used to teach airway clearance due to foreign bodies in children. Method: This is a scoping review protocol built based on the review method proposed by the Joanna Briggs Institute (JBI) and registered in the Open Science Framework. The research question was constructed through the PCC strategy, which includes the mnemonic acronyms as fundamental elements: P -Problem (Airway clearance due to foreign body), C- Concept (Educational technologies), C- Context (1. Child Health). 2. Child health services). All categories of articles that meet the objective will be included, without restrictions on languages, years or country and abstracts in event annals, incomplete articles, duplicate articles and articles that do not address the topic will be excluded. The following data sources will be used: MEDLINE/ Pubmed, SCIELO, SCOPUS, EMBASE, Virtual Health Library (VHL), Director of open access journals, Web of Science, The National Library of Australia Trobe (TROVE), CAPES (Catalog of Theses and Dissertations), Cumulative Index to Nursing and Allied Health Literature (CINALH). Initially, studies will be selected using the titles and abstracts of references identified using the Rayyan QCR tool. Results: They will be presented in the form of a table, flowchart and figure. Conclusions: This study will provide evidence of the main educational technologies used to teach foreign body airway clearance in children.

Descriptors: Educational technology; Child; Heimlich maneuver; Teaching materials; Health education

RESUMEN

Objetivo: mapear las tecnologías educativas utilizadas para enseñar la limpieza de las vías respiratorias por cuerpos extraños en niños. Método: Se trata de un protocolo de revisión del alcance construido a partir del método de revisión propuesto por el Instituto Joanna Briggs (JBI) y registrado en el Open Science Framework. La pregunta de investigación se construyó a través de la estrategia PCC, que incluye como elementos fundamentales las siglas nemotécnicas: P-Problema (Despeje de vía aérea por cuerpo extraño), C- Concepto (Tecnologías educativas), C- Contexto (1. Salud infantil 2. Salud infantil servicios de salud). Se incluirán todas las categorías de artículos que cumplan con el objetivo, sin restricción de idioma, año o país y se excluirán los resúmenes en anales de eventos, artículos incompletos, artículos duplicados y artículos que no aborden el tema. Se utilizarán las siguientes fuentes de datos: MEDLINE/ Pubmed, SCIELO, SCOPUS, EMBASE, Biblioteca Virtual en Salud (BVS), Director de revistas de acceso abierto, Web of Science, Biblioteca Nacional de Australia Trobe (TROVE), CAPES (Catálogo de Tesis y Disertaciones), Índice Acumulativo de Literatura de Enfermería y Afines a la Salud (CINALH). Inicialmente, los estudios se seleccionarán utilizando los títulos y resúmenes de las referencias identificadas mediante la herramienta Rayyan QCR. Resultados: Se presentarán en forma de tabla, diagrama de flujo y figura. Conclusiones: Este estudio proporcionará evidencia de las principales tecnologías educativas utilizadas para enseñar la limpieza de las vías respiratorias de cuerpos extraños en niños.

Descriptores: Tecnología educativa; El niño; Maniobra de heimlich; Materiales de enseñanza; Educación en salud.

REVIEW PROTOCOL

Introdução

Airway obstruction by a foreign body (FBAO) is an emergency that mainly affects children and the elderly[1]. In children, FBAO often leads to high morbidity and mortality rates[2]. Children have characteristics that make them vulnerable to airway obstruction, such as a lack of ability to recognize risky situations, curiosity to explore objects with a tendency to put them in their mouths, smaller airway diameter, underdeveloped swallowing reflex, and immature cough reflex, which increases airway resistance[3-5]. These factors can lead to chronic complications[6] and progress to cardiorespiratory arrest. The likelihood of death depends on the time taken to remove the foreign body and the effectiveness of initial resuscitation[7]. In Brazil, in 2023, there were 302 recorded deaths related to choking in children under one year old, making it the leading cause of mortality from external causes. Most of these deaths occurred in the Northeast and Southeast regions[8].

Therefore, early intervention by laypeople in relieving airway obstruction caused by foreign bodies can be effective in improving outcomes[9]. Studies show a lack of knowledge about how to perform this procedure[10-12], and individuals who have received prior first aid training demonstrate higher levels of knowledge[12].

Thus, educational initiatives focused on this topic are necessary to positively impact outcomes for children[13]. Among educational tools, technology plays an important role, as it contributes to knowledge building, decision-making, and skill development[14]. In this way, technology can be used to teach the management of airway obstruction caused by foreign bodies in children, promoting safe care where rescuers know how to identify and provide proper assistance in cases of FBAO in children.

A preliminary search was conducted on the Open Science Framework (OSF), Medical Literature Analysis and Retrieval System (MEDLINE), and Google Scholar platforms, and no scoping reviews or systematic reviews addressing the objective of this research were found. The aim of this scoping review is to map the educational technologies used to teach the management of airway obstruction by foreign bodies in children.

Mehod

Study Design

This is a scoping review protocol registered on the Open Science Framework with DOI: 10.17605/OSF.IO/XN72W, available at: https://osf.io/xn72w/. The review follows the recommendations of the Joanna Briggs Institute (JBI), which suggests the following steps: 1) Define the objective and research question, 2) Identify inclusion criteria, 3) Develop the search strategy, 4) Select evidence sources, 5) Extract data, 6) Analyze evidence, and 7) Present results.

Research Question

Using the PCC strategy (Population, Concept, Context), the following research question was formulated: *What educational technologies are used for teaching foreign body airway obstruction management in children?*

Problem

The problem addressed is the management of airway obstruction by foreign bodies, as it is a potentially fatal event if rescuers lack knowledge on how to act.

Concept

Different educational technologies will be included, provided they meet the study's objective. Technologies will be classified as digital and non-digital. Digital technologies refer to tools that utilize various hardware and software types. Technologies not classified as digital but that meet the study's goal will be considered non-digital.

Context

This review's context includes health services that serve children and studies addressing child health, whether in primary care, hospitals, or health education for the community, parents, or caregivers.

Eligibility Criteria

Primary and secondary studies that portray the contributions of educational technologies used for teaching airway obstruction relief in children will be included, considering the age range defined by the Brazilian Child and Adolescent Statute (ECA), which considers a child to be up to 12 years old (not yet completed). All categories of articles will be included (original research, literature review, systematic review, reflection, update, and experience report), as well as dissertations and theses. Technologies that are validated or not will be considered. There will be no restrictions regarding language, year, or country. Abstracts from conference proceedings, incomplete articles, duplicate articles, and those that do not address the topic will be excluded.

Types of Information Sources

The following databases will be selected: Medline/Pubmed, SCIELO, SCOPUS, EMBASE, Virtual Health Library (BVS), Directory of Open Access Journals (DOAJ), Web of Science, The National Library of Australia Trobe (TROVE), CAPES (Theses and Dissertations Catalog), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Science Direct.

Search Strategy

In the initial search of the studies, the following combinations will be applied: ("Heimlich Maneuver" OR "Airway Obstruction") AND ("Educational Technology" OR "Technology, Educational") AND ("Child Health"), to identify the most frequently used keywords in studies published in the National Library of Medicine (PubMed) and Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases. After that, the search strategies were built based on descriptors from the Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH) vocabulary, using the Boolean operators "AND" and

"OR" in the combination, according to the specificities of each source, as described below: ("Heimlich Maneuver" OR "Airway Obstruction" OR Gagging) AND ("Educational Technology" OR "Technology, Educational" OR "Instructional Technology" OR Technology OR "Biomedical Technology" OR "Digital Technology" OR "Information Technology" OR "Teaching Materials" OR "Instructional Film and Video" OR "Video Games" OR "Education, Distance" OR "Mobile Applications" OR "Artificial Intelligence" OR "Augmented Reality" OR Simulation) AND ("Child Health" OR Child OR Children OR "Child Health Services" OR "Child, Preschool" OR "Infant, Newborn" OR "Preschool child" OR Infant*). The search strategy will be adapted for each data source using the descriptors presented, as shown in Table 1.

Table 1 - Database search strategy. Salvador, Bahia, Brazil. 2025.

Source of Information	Search Strategy	No. of Records Retrieved
MEDLINE/ Pubmed	("Heimlich Maneuver" OR "Airway Obstruction" OR Gagging) AND ("Educational Technology" OR "Technology, Educational" OR "Instructional Technology" OR Technology OR "Biomedical Technology" OR "Digital Technology" OR "Information Technology" OR "Teaching Materials" OR "Instructional Film and Video" OR "Video Games" OR "Education, Distance" OR "Mobile Applications" OR "Artificial Intelligence" OR "Augmented Reality" OR Simulation) AND ("Child Health" OR Child OR Children OR "Child Health Services" OR "Child, Preschool" OR "Infant, Newborn" OR "Preschool child" OR Infant*).	448
SCIELO	("Heimlich Maneuver" OR "Airway Obstruction" OR Gagging) AND ("Educational Technology" OR "Technology, Educational" OR "Instructional Technology" OR Technology OR "Biomedical Technology" OR "Digital Technology" OR "Information Technology" OR "Teaching Materials" OR "Instructional Film and Video" OR "Video Games" OR "Education, Distance" OR "Mobile Applications" OR "Artificial Intelligence" OR "Augmented Reality" OR Simulation) AND ("Child Health" OR Child OR Children OR "Child Health Services" OR "Child, Preschool" OR "Preschool child" OR "Infant, Newborn" OR Infant*)	1
SCOPUS	(TITLE-ABS-KEY ("Heimlich Maneuver" OR "Airway Obstruction" OR gagging) AND TITLE-ABS-KEY ("Educational Technology" OR "Technology, Educational" OR "Instructional Technology" OR technology OR "Biomedical Technology" OR "Digital Technology" OR "Information Technology" OR "Teaching Materials" OR "Instructional Film and Video" OR "Video Games" OR "Education, Distance" OR "Mobile Applications" OR "Artificial Intelligence" OR "Augmented Reality" OR simulation) AND TITLE-ABS-KEY ("Child Health" OR child OR children OR "Child Health Services" OR "Child, Preschool" OR "Infant, Newborn" OR "Preschool child" OR infant*)) AND PUBYEAR > 2018 AND PUBYEAR < 2025 AND (LIMIT-TO (LANGUAGE , "English") OR LIMIT-TO	277

	(LANGUAGE , "Portuguese") OR LIMIT-TO (LANGUAGE , "Spanish"))	
EMBASE	('heimlich maneuver' OR 'airway obstruction' OR gagging) AND ('educational technology'/exp OR 'technology, educational' OR 'instructional technology' OR 'technology'/exp OR 'biomedical technology' OR 'digital technology' OR 'information technology'/exp OR 'teaching materials/exp' OR 'instructional film and video' OR 'video games'/exp OR 'education, distance' OR 'mobile applications' OR 'artificial intelligence/exp' OR 'augmented reality' OR simulation) AND ('child health' OR 'child'/exp OR children OR 'child health services' OR 'child, preschool' OR 'preschool child' OR 'infant, newborn' OR infant) AND (2019:py OR 2020:py OR 2021:py OR 2022:py OR 2023:py OR 2024:py) AND ('article'/it OR 'article in press'/it OR 'review'/it)	165
Virtual Health Library (VHL)	("Heimlich Maneuver" OR "Airway Obstruction" OR Gagging) AND ("Educational Technology" OR "Technology, Educational" OR "Instructional Technology" OR Technology OR "Biomedical Technology" OR "Digital Technology" OR "Information Technology" OR "Teaching Materials" OR "Instructional Film and Video" OR "Video Games" OR "Education, Distance" OR "Mobile Applications" OR "Artificial Intelligence" OR "Augmented Reality" OR Simulation) AND ("Child Health" OR Child OR Children OR "Child Health Services" OR "Child, Preschool" OR "Preschool child" OR "Infant, Newborn" OR Infant*)	11
Director of open access journals	(“Heimlich Maneuver” OR “Airway Obstruction” OR Gagging) AND (“Educational Technology” OR “Technology, Educational” OR “Instructional Technology” OR Technology OR “Biomedical Technology” OR “Digital Technology” OR “Information Technology” OR “Teaching Materials” OR “Instructional Film and Video” OR “Video Games” OR “Education, Distance” OR “Mobile Applications” OR “Artificial Intelligence” OR “Augmented Reality” OR Simulation) AND (“Child Health” OR Child OR Children OR “Child Health Services” OR “Child, Preschool” OR “Infant, Newborn” OR Infant*)	0
Web of Science	((ALL=(“Heimlich Maneuver” OR “Airway Obstruction” OR Gagging)) AND ALL=(“Educational Technology” OR “Technology, Educational” OR “Instructional Technology” OR Technology OR “Biomedical Technology” OR “Digital Technology” OR “Information Technology” OR “Teaching Materials” OR “Instructional Film and Video” OR “Video Games” OR “Education, Distance” OR “Mobile Applications” OR “Artificial Intelligence” OR “Augmented Reality” OR Simulation)) AND ALL=(“Child Health” OR Child OR Children OR “Child Health Services” OR “Child, Preschool” OR "Preschool child" OR “Infant, Newborn” OR Infant*)	253
The National Library of Australia Trobe (TROVE)	(“Heimlich Maneuver” OR “Airway Obstruction” OR Gagging) AND (“Educational Technology” OR “Technology, Educational” OR “Instructional Technology” OR Technology OR “Biomedical Technology” OR “Digital Technology” OR “Information Technology” OR “Teaching Materials” OR “Instructional Film and Video” OR “Video Games” OR “Education, Distance” OR “Mobile Applications” OR “Artificial Intelligence” OR “Augmented	192

	Reality" OR Simulation) AND ("Child Health" OR Child OR Children OR "Child Health Services" OR "Child, Preschool" OR "Infant, Newborn" OR Infant*)	
CAPES (Catalog of Theses and Dissertations)	Gagging	3
Cumulative Index to Nursing and Allied Health Literature (CINALH)	("Heimlich Maneuver" OR "Airway Obstruction" OR Gagging) AND ("Educational Technology" OR "Technology, Educational" OR "Instructional Technology" OR Technology OR "Biomedical Technology" OR "Digital Technology" OR "Information Technology" OR "Teaching Materials" OR "Instructional Film and Video" OR "Video Games" OR "Education, Distance" OR "Mobile Applications" OR "Artificial Intelligence" OR "Augmented Reality" OR Simulation) AND ("Child Health" OR Child OR Children OR "Child Health Services" OR "Child, Preschool" OR "Infant, Newborn" OR Infant*)	432
Science Direct	("Heimlich Maneuver" OR "Airway Obstruction" OR Gagging) AND ("Educational Technology" OR "Technology, Educational") AND ("Child Health" OR Child OR Children OR "Child Health Services")	26

Selection of the source of evidence

After selection, the references will be exported to the Intelligent Systematic Review Software (Rayyan) to remove duplicates and organize the studies. The titles and abstracts will be read by the reviewers and later the studies will be read in full. If there are doubts or disagreements about the inclusion of studies, it will be resolved through debate among the reviewers. The inclusion of studies will be carried out through the PRISMA-ScR flowchart.

Data extraction

The data will be extracted and organized through a table in word built by the authors and the following information will be included: Authors, year of publication, countries, types of studies and levels of evidence, objectives, study setting, target audience and final considerations of the study. The level of evidence (NE) ratings of the studies will be based on Melnik's recommendations[18].

Data analysis and presentation

The data will be presented in charts and tables and the technologies will be categorized according to similar characteristics and grouped based on the modalities of teaching the technologies.

Data analysis and presentation

The results will be presented using the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR)[19].

Conclusion

It is hoped that this study can contribute to the teaching of educational technologies about airway clearance by strangers in children, highlighting the

main technologies and the gaps directed to the theme, making it possible to direct knowledge to future research.

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Correspondent Author
Andressa Silva Carneiro de Souza
241 Basílio da Gama St.ZIP: 40231-300 - Canela.
Salvador, Bahia, Brazil.
andressa.carneiro@ufba.br