

Skill development for aeromedical evacuation in emergencies and disasters: a scoping review protocol

Desenvolvimento de competências para evacuação aeromédica em emergências e desastres: protocolo de revisão de escopo

Débora Fernanda Haberland^{1,2}

ORCID: 0000-0001-5448-6278

Thiago Augusto Soares Monteiro da Silva¹

ORCID: 0000-0001-6870-5101

Alexandre Barbosa de Oliveira¹

ORCID: 0000-0003-4611-1200

¹Federal University of Rio de Janeiro, Anna Nery School of Nursing, Rio de Janeiro, RJ, Brazil

²Brigadeiro Médico Roberto Teixeira Institute of Aerospace Medicine, Rio de Janeiro, RJ, Brazil

Editors:

Ana Carla Dantas Cavalcanti

ORCID: 0000-0003-3531-4694

Paula Vanessa Peclat Flores

ORCID: 0000-0002-9726-5229

Érica Brandão de Moraes

ORCID: 0000-0003-3052-158X

Corresponding author:

Débora Fernanda Haberland

E-mail: deborahaber@hotmail.com

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ABSTRACT

Objective: to map the technical-scientific production on the skills necessary for aeromedical evacuation in emergency and disaster situations involving chemical, biological, radiological, and nuclear agents. **Method:** scoping review protocol. The elaboration of this protocol was based on the Joanna Briggs Institute's recommendations, following the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). This protocol will guide the identification of the sources of information, data extraction, and the analysis of the results based on the need to support the analysis of training actions for health teams facing clinical and managerial demands that must be carefully considered in such situations.

Descriptors: Disasters; Air Ambulances; Competency-Based Education.

RESUMO

Objetivo: mapear a produção técnico-científica sobre as competências necessárias para o desenvolvimento de evacuações aeromédicas em situações de emergências e desastres envolvendo agentes químicos, biológicos, radiológicos e nucleares.

Método: protocolo de revisão de escopo. A elaboração deste protocolo foi baseada nas recomendações do Instituto Joanna Briggs, atendendo às recomendações do *Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews* (PRISMA-ScR). Este protocolo orientará o processo de identificação de fontes de informação, extração de dados e análise de resultados, a partir da necessidade de dar suporte à análise das ações de capacitação de equipes de saúde frente às demandas clínicas e gerenciais a serem criteriosamente observadas em tais situações.

Descritores: Desastres; Resgate Aéreo; Educação Baseada em Competências.

INTRODUCTION

The concern with incidents involving chemical, biological, radiological, and nuclear (CBRN) agents has been the subject of consideration in the fields of Defense and Health. According to the Brazilian constitution, in situations of this nature, the Armed Forces must act jointly, guided by the Ministry of Defense, in subsidiary actions supporting Civil Defense⁽¹⁾.

In addition to the concern with the use of this type of agent in attacks, under other circumstances, there is also the possibility of natural disasters triggering events involving CBRN agents, such as the one that occurred at the Fukushima Nuclear Power Plant in 2011, due to the tsunami generated after an earthquake⁽²⁾.

It is noteworthy that disasters due to epidemics are also of national relevance in addition to the conflict situation itself. Most patients will be treated in the affected area during an outbreak of Highly Hazardous Communicable Diseases (HHCD). However, there are circumstances for which high-level containment aeromedical transport of patients with HHCD is necessary⁽³⁾. The involvement of military professionals in risk management actions and operational situations of emergencies and disasters involving CBRN agents is something expected and opportune. However, it demands extensive

training investments to organize better and integrate their actions with the civilian agencies that are often the first responders. This implies framing the commitment of swift and effective intersectoral actions, which reduce potential damages and decrease the number of fatal victims.

Chemical, biological, radiological, nuclear, and explosive incidents are rare, but they can be fatal for those responding to these disasters. Therefore, everyone who works in these environments must be adequately prepared and trained⁽⁴⁾. Operations in these extreme situations related to biological wars, bioterrorism, or alarming epidemics will certainly require specialized training with the capacity to evacuate safely through air medical transport⁽¹⁾.

Taking as a premise that excellence in training can generate flight safety, the safety of the patient and of the onboard team itself, economy and parsimonious use of mobilized resources, reduction of response time, and safe and quality assistance in aeromedical evacuations can be achieved by training of health teams – a special condition to be carefully considered.

Within the scope of training strategies, it is necessary to identify aspects that, due to the nature and complexity of aeromedical evacuations in emergencies and disasters involving CBRN agents, include general and specific care for victims, the clinical and subclinical effects resulting from exposure to these agents, the contamination risks, biosafety, and management practices, among others.

Considering that the preparation for responding to events involving from CBRN agents assumes increasing relevance in the global scenario, especially in occasions of wide worldwide visibility, such as mass events, where there is the possibility of accidents and the use of improvised devices using these types of agents in cases of terrorist attacks⁽⁵⁾, and that air medical evacuation has become a strategic health technology to face such situations, the objective of this scoping review will be to map the technical-scientific production on the skills necessary for aeromedical evacuation in emergency and disaster situations involving CBRN agents.

There is an extensive number of publications on topics that relate air medical transport to disasters. However, few contemplate situations involving CBRN agents. Therefore, this scoping review will be conducted to operationalize a mapping of the production of useful knowledge to

instruct the construction and revision of curricula aimed at these practices.

To this end, the guidelines of the Joanna Briggs Institute⁽⁶⁾ state that the scoping review constitutes a technique widely used in health sciences to synthesize and disseminate the results of studies on a given subject. Indeed, a scoping analysis seeks to map the existing production using a rigorous and transparent method and providing a descriptive view of the available studies without evaluating them critically, as in systematic reviews.

METHOD

A scoping review will be conducted using the method proposed by the JBI and the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA – ScR) checklist, which allows the synthesis of knowledge and mapping of concepts in a research field^(6,7). For this purpose, a protocol was structured and registered in the Open Science Framework (OSF) through the link <https://osf.io/jftzk/>

Review question

The proposed review aims to answer the following question: What skills should be considered in the training of health professionals engaged in aeromedical transport and evacuation in emergency and disaster situations involving chemical, biological, radiological, and nuclear agents?

Through the acronym PCC (Population, Concept, and Context) indicated for conducting scope reviews, the following elements were defined: P (Population) - Health teams (physicians, nurses, and nursing technicians);

C (Concept) – Skills (including pedagogical strategies); and

C (Context) - Transport and air evacuation in emergencies and disasters involving chemical, biological, radiological, and nuclear agents.

Eligibility criteria for information sources and databases

The following inclusion criteria will be considered: all categories of documents (articles, theses, dissertations, legislations, manuals, and complete texts available for analysis), addressing the competencies or training of the health team necessary to perform aeromedical evacuations in emergency and disaster situations involving CBRN agents. All languages and years of publication will be included.

The exclusion criteria will be incomplete studies not available in full text.

The searches will be carried out in the following databases, information portals, and grey literature portals: the Regional Portal of the Virtual Health Library (VHL) under the responsibility of the Latin American and Caribbean Health Science Information Center (BIREME), in its main databases: Latin American and Caribbean Health Science Literature Database (LILACS), Spanish Bibliographic Index of the Health Sciences (IBECS), Database in Nursing (BDENF), National Collection of Sources of Information from SUS (Coleciona SUS), DISASTERS, and others. The Pubmed Portal and Pubmed Central (PMC) of the National Library of Medicine (NLM) and the Scientific Electronic Library Online (SciELO) digital library will also be accessed. The following databases will also be considered from the Capes Portal of Journals: Elsevier: Embase and Scopus, Clarivate Analytics: Web of Science, Ebsco: Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Academic Search Premier.

Search strategy

The search strategies will be developed for each base or electronic repository. The search results will be exported to the Endnote reference manager to identify duplicates and, later, to the Rayyan® application from the Qatar Computing Research Institute, QCRI, to assist in the selection process.

Initial searches were conducted in the Embase, Pubmed, and SciELO databases, as shown in Figure 1:

From the Population, Concept, and Context elements, the terms were mapped in the controlled vocabularies, considering the Descriptors in Health Sciences (DECS), Medical Subject Headings (MESH), and Emtree (Embase subject headings) terms. Terms identified in the titles, abstracts, and descriptors/MESH of the preliminary search articles were added.

The associations of sets of terms from the Participant ("Patient Assistance Team") and Context ("Hazardous Substances" and "Air Transport" or "Air Evacuation") components were defined as search strategies. For the combination of synonymous terms, we used the Boolean operators OR, which allows grouping the terms, and AND, for the intersection of terms in groups.

Evidence selection

The title and abstract screening will be conducted by the team of reviewers using the Rayyan

software, facilitating the conduction and selection of studies, individually and simultaneously, in a blinded way.

Selection results will be presented in a flowchart of Report Items suitable for this type of review^(6,7) to demonstrate the totality of the searches and the process of study selection and inclusion.

The reasons for inclusion will be assigned and labels will be included. From this first stage, a new selection will be conducted based on the critical reading of the texts.

All titles and abstracts of identified records will be analyzed for relevance to the purpose of this study, and eligible texts will be read in full to confirm the relevance and extract data of interest.

Data extraction

Two reviewers will independently conduct data extraction. A third researcher's decision will be considered in the absence of consensus.

After the analysis of the extracted data, a presentation structure will be developed based on the characteristics and aspects of the competencies reported in the studies.

The reviewers will present the data using a chart, previously structured by the reviewers and authors (Figure 2). The chart contains information such as type of publication, author, journal/type of document, institution to which the research is linked, country of publication, type of institution of the authors (civilian or military), title, year, language, general objective, skills mapped, type of agent involved, and relevant conclusions.

Data analysis and presentation

At this stage, the extracted data will be analyzed and presented using tables to represent the objective of this scoping review.

The results will clarify which skills are needed to conduct the aeromedical evacuation in emergency and disaster situations involving CBRN agents. A descriptive analysis will accompany the mapped and tabulated results, describing how they relate to the purpose and question of the review.

It is believed that the skills to be mapped through this review may guide the development of curricula and guidelines aimed at training civilian and military professionals to improve the standard of response to future events involving the aerial transportation of victims of exposure to CBRN agents.

EMBASE	<p>(`patient care team'/exp OR `patient care team' OR `patient care teams' OR `medical care team' OR `medical care teams' OR `interdisciplinary health team' OR `interdisciplinary health teams' OR `healthcare team' OR `healthcare teams' OR `health care team' OR `health care teams' OR `nursing'/exp OR nursing OR nursings OR `nurses'/exp OR nurses OR `nurse'/exp OR nurse OR `physicians'/exp OR physicians OR `physician'/exp OR physician OR `licensed practical nurses'/exp OR `licensed practical nurses' OR `licensed practical nurse'/exp OR `licensed practical nurse' OR `licensed vocational nurses' OR `licensed vocational nurse'/exp OR `licensed vocational nurse' OR `patient care'/exp OR `patient care') AND (`hazardous substances'/exp OR `hazardous substances' OR `biohazard'/exp OR biohazard OR biohazards OR `environmental toxic substances' OR `hazardous chemical'/exp OR `hazardous chemical' OR `hazardous chemicals' OR `hazardous material'/exp OR `hazardous material' OR `hazardous materials' OR `hazardous substance' OR `toxic environmental substance' OR `toxic environmental substances' OR `radiation accidented' OR `chemical, biological, radioactive and nuclear agents (cbrn)' OR cbrn OR ((agent* OR accident* OR product* OR waste*) AND (chemical OR biologic* OR `biological'/exp OR biological OR radioactive* OR `radiation'/exp OR radiation OR radiological OR nuclear OR hazardous OR `explosive'/exp OR explosive OR inflammable OR radioactive))) AND (`air ambulances'/exp OR `air ambulances' OR `air ambulance'/exp OR `air ambulance' OR `emergency helicopters' OR `emergency helicopter' OR `helicopter ambulances' OR `helicopter ambulance'/exp OR `helicopter ambulance' OR `aircraft'/exp OR aircraft OR helicopter* OR airplane* OR `transportation of patients'/exp OR `transportation of patients' OR `patients transportation' OR `patients transportations' OR `aeromedical evacuation' OR `airports'/exp OR airports OR `airport'/exp OR airport OR ((`evacuation'/exp OR evacuation) AND (`air'/exp OR air OR helicopter* OR aircraft* OR airplane*)))</p>
PUBMED	<p>("Air Ambulances"[mh] OR Air Ambulance*[tiab] OR Emergency Helicopter*[tiab] OR Helicopter Ambulance*[tiab] OR "Aircraft"[mh] OR Aircraft*[tiab] OR Helicopter*[tiab] OR Airplane*[tiab] OR "Transportation of Patients"[mh] OR Patients Transportation*[tiab] OR Aeromedical evacuation[tiab] OR Airport*[tiab] OR ((Evacuation[tiab]) AND (Air[tiab] OR helicopter*[tiab] OR aircraft*[tiab] OR airplane*[tiab] OR medical[tiab]))) AND (("Hazardous Substances"[mh] OR Biohazard*[tiab] OR Environmental Toxic Substance*[tiab] OR Hazardous Chemical*[tiab] OR Hazardous Material*[tiab] OR Hazardous Substance*[tiab] OR Toxic Environmental Substance*[tiab] OR radiation accidented[tiab] OR CBRN[tiab] OR Chemical Explosion[tiab] OR ((agent*[tiab] OR accident*[tiab] OR product*[tiab] OR Waste*[tiab]) AND (chemical*[tiab] OR biologic*[tiab] OR biological*[tiab] OR radioactive*[tiab] OR radiation*[tiab] OR Radiological[tiab] OR nuclear*[tiab] OR Hazardous[tiab] OR Explosive*[tiab] OR Inflammable*[tiab] OR Radioactive*[tiab]))) AND ("Patient Care"[mh] OR "Patient Care"[tiab] OR "Patient Care Team"[mh] OR Patient Care Team*[tiab] OR Medical Care Team*[tiab] OR Interdisciplinary Health Team*[tiab] OR Healthcare Team*[tiab] OR Health Care Team*[tiab] OR "Nursing"[mh] OR Nursing*[tiab] OR "Nurses"[mh] OR Nurse*[tiab] OR "Physicians"[mh] OR Physician*[tiab] OR doctor*[tiab] OR "Licensed Practical Nurses"[mh] OR "Licensed Practical Nurse"[tiab] OR Licensed Vocational Nurse*[tiab] OR "patient management"))</p>
SCIELO	<p>("Patient Care Team" OR "Patient Care Teams" OR "Medical Care Team" OR "Medical Care Teams" OR "Interdisciplinary Health Team" OR "Interdisciplinary Health Teams" OR "Healthcare Team" OR "Healthcare Teams" OR "Health Care Team" OR "Health Care Teams" OR nursing OR nursings OR nurses OR nurse OR physicians OR physician OR "Licensed Practical Nurses" OR "Licensed Practical Nurse" OR "Licensed Vocational Nurses" OR "Licensed Vocational Nurse" OR "Patient Care") AND ("Hazardous Substances" OR biohazard OR biohazards OR "Environmental Toxic Substances" OR "Hazardous Chemical" OR "Hazardous Chemicals" OR "Hazardous Material" OR "Hazardous Materials" OR "Hazardous Substance" OR "Toxic Environmental Substance" OR "Toxic Environmental Substances" OR "radiation accidented" OR "Chemical, Biological, Radioactive and Nuclear agents (CBRN)" OR cbrn OR ((agent* OR accident* OR product* OR waste*) AND (chemical OR biologic* OR biological OR radioactive* OR radiation OR radiological OR nuclear OR hazardous OR explosive OR inflammable OR radioactive))) AND ("Air Ambulances" OR "Air Ambulance" OR "Emergency Helicopters" OR "Emergency Helicopter" OR "Helicopter Ambulances" OR "Helicopter Ambulance" OR aircraft OR helicopter* OR airplane* OR "Transportation of Patients" OR "Patients Transportation" OR "Patients Transportations" OR "Aeromedical evacuation" OR airports OR airport OR ((evacuation) AND (air OR helicopter* OR aircraft* OR airplane*)))</p>

Figure 1 - Search strategies. Rio de Janeiro, RJ, Brazil, 2021

Source: Prepared by the authors, 2021.

Reviewer:										Date of extraction:			
Type of publication	Author	Year	Journal	Institutions linked to the research	Country	Institution of authors (civil or military)	Title	Language	Main goal	Study design	Skills mapped	Type of agent involved	Relevant conclusions

Figure 2 - Data extraction instrument. Rio de Janeiro, RJ, Brazil, 2021

Source: Prepared by the authors, 2021.

CONFLICT OF INTEREST

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

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AUTHORSHIP CONTRIBUTIONS

Project design: Haberland DF, Silva TASM, Oliveira AB

Data collection: Haberland DF, Silva TASM, Oliveira AB

Data analysis and interpretation: Haberland DF, Silva TASM, Oliveira AB

Writing and/or critical review of the intellectual content: Haberland DF, Silva TASM, Oliveira AB

Final approval of the version to be published: Haberland DF, Silva TASM, Oliveira AB

Responsibility for the text in ensuring the accuracy and completeness of any part of the paper: Haberland DF, Silva TASM, Oliveira AB



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