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Review

Challenges and best practices of dispatcher-assisted cardiopulmonary resuscitation: A scoping review protocol



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Abstract

Introduction: Improved survival from out-of-hospital cardiac arrest with good neurological outcome was observed in association with dispatcher-assisted cardiopulmonary resuscitation, increasing the number of bystander-initiated resuscitations and minimizing the no-flow time in the first minutes of cardiac arrest.

Objective: The objective of this scoping review is to map and summarise the existing literature on dispatcher-assisted cardiopulmonary resuscitation, focusing on reported experiences, challenges, and best practices, highlighting strategies that could improve the provision of cardiopulmonary resuscitation instructions to bystanders during out-of-hospital cardiac arrest.

Inclusion criteria: Studies related to dispatcher-assisted cardiopulmonary resuscitation, involving human subjects, with an English abstract. The concept of interest is focused on the methods of provision of dispatcher-assisted cardiopulmonary resuscitation analysing specific experiences of implementation, challenges, and best practices, and can be generalized to any country; cultural factors, geographic features, and specific racial or gender-based differences will be analysed and discussed.

Methods: Four databases (PubMed, Embase, Cumulative Index to Nursing & Allied Health Literature, and the Cochrane Library) will be searched for studies published from 2018 to 2023. All study designs, including experimental and observational studies, will be assessed for inclusion. Titles and abstracts of identified citations will be screened for inclusion; subsequently, full texts of potentially relevant sources will be assessed for inclusion by two reviewers. Any disagreements between the reviewers will be resolved through discussion. Relevant grey literature (conference proceedings, government documents, and theses) will be analysed and included. Data will be extracted in a standardized form, following Joanna Briggs Institute recommendations. Results will be synthesized and reported using a narrative approach, categorising findings into themes related to the effectiveness of dispatcher-assisted cardiopulmonary resuscitation, challenges, and best practices.

Keywords: Out of hospital cardiac arrest, Dispatcher-assisted cardiopulmonary resuscitation, Telephone CPR, Emergency medical communication centre, Scoping review protocol

Introduction

Out-of-hospital cardiac arrest (OHCA) is a significant global health burden, ranking as the third leading cause of death in Europe with an annual incidence of 30–166 per 100,000 people.^{1–3} Despite recent advancements in OHCA treatment, including extracorporeal life support and improved post-resuscitation care, survival rates across high-income countries with well-structured emergency medical services (EMS) remain low, ranging from 8% in Europe¹ to 13% in Australia and New Zealand,⁴ and 10.4% in the United

States.⁵ Furthermore, data collected by the International Liaison Committee On Resuscitation (ILCOR) reports an even lower rate of favourable neurological outcomes at hospital discharge or 30 days after EMS-treated OHCA, ranging from 2.8% to 18.2%. However, this rate improves significantly from 9.9% to 33.3% in bystander-witnessed cardiac arrests.⁶

In the last years, improved survival from OHCA was observed in association with community interventions, such as the prompt provision of cardiopulmonary resuscitation (CPR) by bystanders and the availability of a defibrillator.⁷ Accordingly, guidelines and recommendations identified a series of strategies for reducing OHCA mortality

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and optimizing outcomes. In 2021 the European Resuscitation Council guidelines included a “System saving lives” chapter, describing a group of interventions as a system-level approach, emphasizing the interconnection between the community and EMS.⁸ Among them, particular attention has been drawn to the role of Emergency Medical Communication Centres’ (EMCCs) dispatchers, highlighting their role in the prompt identification of OHCA and in providing CPR instructions to bystanders, thus increasing the number of CPR providers and minimizing the no-flow time in the first minutes of cardiac arrest. Recent systematic reviews and meta-analyses reported that Dispatcher-Assisted Instructions (DAI), also known as Dispatcher-Assisted CPR (DA-CPR) or telecommunicator-CPR (T-CPR), are effective in increasing the rate of resuscitation manoeuvres performed by bystanders, return of spontaneous circulation (ROSC), survival, and good neurological outcome.^{9,10} Strengthening the first link of the chain of survival, particularly the role of EMCC, has become imperative and is currently recognized as a priority to increase the rate of bystander CPR and survival from OHCA.^{11,12}

A preliminary search of MEDLINE, the Cochrane Database of Systematic Reviews and Joanna Briggs Institute (JBI) Evidence Synthesis was conducted and identified a series of systematic reviews, mostly related to analysing survival outcomes,^{7,9,10,13–17} and two scoping reviews, one focused on video calls during EMS dispatch¹⁸ and one exploring the evidence of interventions aiming to optimise CPR instructions.¹⁹ Our scoping review will primarily focus on organizational issues and factors favouring and hindering the provision of DA-CPR (e.g. optimal dispatcher training/retraining, and quality improvement programs), also analysing some of the knowledge gaps identified in the 2019 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations.²⁰

This scoping review aims to map reported experiences describing all the interventions related to DA-CPR that have been tried, measured, and reported in the literature, highlighting strategies and feasibility measures that could improve the implementation of DA-CPR programs and the provision of CPR instructions to bystanders.

Review question

A structured question will be defined, following the PCC mnemonic (population, concept, context), to answer the following questions:

- What strategies can be utilized to promote the implementation of dispatcher-assisted CPR programs?
- What are the best practices recommended in the literature for dispatchers providing CPR instructions?
- What challenges and barriers exist in the provision of dispatcher-assisted CPR?

Population

OHCA patients, without age limits.

Concept

The concept of interest of this scoping review is focused on the methods of provision of dispatcher-assisted CPR in OHCA, analysing specific experiences of implementation.

This research could also map and identify challenges related to DA-CPR at system, provider, and bystander levels.

Context

Even considering potential differences, the topic of dispatchers’ assistance in providing CPR during OHCA has no specific context and can be generalized to any country. When possible, cultural factors, geographic features (e.g. low-resource countries), and specific racial or gender-based differences will be analysed and discussed.

Eligibility criteria

Inclusion criteria

Studies conducted on dispatcher-assisted CPR, involving human subjects of any age.

Studies related to dispatcher-assisted CPR, challenges, and best practices.

All study designs, including experimental and observational studies, will be considered, with particular focus on qualitative studies reporting interventions related to DA-CPR. Grey literature will be searched for relevant conference proceedings, theses, or government documents.

Exclusion criteria

Studies not related to dispatcher-assisted CPR.

Studies performed in simulated settings.

Studies without an English abstract.

Types of sources

Electronic databases (PubMed, Embase, Cumulative Index to Nursing and Allied Health Literature -CINAHL-, Cochrane Library) will be searched for peer-reviewed articles related to the research questions. Reference lists of relevant articles will also be considered.

Grey literature will be searched in specific repositories, using a combination of the keywords: Scopus and Embase for conference proceedings; Open Access Theses and Dissertations database (<https://www.oatd.org>) for theses, web search engines and social media (X and LinkedIn) for government documents, guidelines, and other relevant scripts.

Methods

This scoping review will be conducted following the JBI methodology for scoping reviews.²¹

Search strategy

An initial limited search of Pubmed was undertaken to identify articles on the topic. The text words contained in the titles and abstracts of relevant articles, and the index terms used to describe the articles were used to develop a full search strategy for PubMed, Embase, CINAHL, and the Cochrane Library.

The search strategy, including all identified keywords and index terms, will be adapted for each included source. The reference list of all included sources of evidence will be screened for additional studies.

A systematic search will be conducted in four electronic databases using a combination of keywords and MeSH terms, including but not limited to “Dispatcher-assisted CPR”, “Telephone cardiopulmonary resuscitation”, “Pre-Arrival Instructions” and related outcomes (“Survival”, “Hospital discharge”, “return of spontaneous circulation”, “Neurological outcome”). The search will be performed at the end of April 2024.

Pubmed search string is reported in [Table 1](#).

Table 1 – PubMed search strategy.

Search string	("cardiac arrest" OR "cardiac arrest"[MeSH] OR "out of hospital cardiac arrest" OR "OHCA" OR "sudden death" OR "cardiopulmonary resuscitation"[MeSH] OR "cardiopulmonary resuscitation" OR "CPR" OR "basic life support" OR "Cardio-Pulmonary Resuscitation") AND ("Pre-arrival instruction" OR "audio-delivered instruction" OR "video-delivered instruction" OR "Video-assisted bystander" OR "telephone CPR" OR "T-CPR" OR "telephoner cardiopulmonary resuscitation" OR "Telephone-Basic Life Support" OR "Dispatcher-Assisted Bystander" OR "Telecommunicator Cardiopulmonary Resuscitation" OR "dispatcher-assisted" OR Dispatch) AND ("Survival" OR "Hospital discharge" OR "return of spontaneous circulation" OR ROSC OR "Neurological outcome" OR "cerebral performance category" OR CPC)
Limits	English abstract available Articles published between 2018 and 2023

Studies with an English abstract, conducted on dispatcher-assisted CPR, involving human subjects of any age, focused on implementation experiences, challenges and best practices, published from 1st January 2018 to 31st December 2023 will be considered for inclusion. This timeframe has been identified to assess the available literature reporting the implementation of DA-CPR following the 2019 and 2020 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations, based on a systematic review (searched up to July 2018).^{10,20,22}

The databases to be searched include PubMed, Embase, CINAHL, and the Cochrane Library. Available conference papers, reports, and guidelines will be assessed for inclusion.

Source of evidence selection

Following the search, all identified citations will be uploaded into Rayyan and duplicates removed. Titles and abstracts will then be screened for inclusion by two independent reviewers. Potentially relevant sources will be retrieved in full and will be assessed in detail against the inclusion criteria by two independent reviewers. Reasons for the exclusion of sources of evidence in full texts that do not meet the inclusion criteria will be recorded and reported. Any disagreements between the reviewers at each stage of the selection process will be resolved through discussion, involving a third researcher if necessary. The results of the search and the study inclusion process will be reported in full in the final scoping review and presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses extension for scoping review (PRISMA-ScR) flow diagram.²³

Data extraction

Data will be extracted in a standardized form, following JBI recommendations for data synthesis, including information on authors, publication year, country, study design, mapping of the interventions, challenges, best practices and feasibility, description of barriers, and other key findings relevant to the review questions. The data extraction tool will be modified and revised as necessary during the data extraction process. Any disagreements between the researchers will be resolved through discussion.

Quality appraisal

Given the scoping nature of this review, a formal quality assessment of individual studies will not be conducted. However, the methodological rigour and limitations of the included studies will be discussed in the synthesis.

Consultation

Consultation with knowledge users, such as emergency medical services dispatchers, other researchers, and members of relevant scientific societies, will be considered to ensure the relevance and applicability of the findings. Considering their lived experience, the research team will try to include bystanders who have performed DA-CPR in the consultation, to understand proactive elements and barriers from their peculiar point of view. Consultations will be performed during the analysis of the results, to summarize and categorize the evidence, before the presentation of the final work.

Data analysis and presentation

Data will be synthesized and reported using a narrative approach, categorising findings into themes related to best practices and challenges for the provision of dispatcher-assisted CPR. Studies reporting efficacy or effectiveness outcomes will be identified for further systematic analysis. Results will be presented using tables, charts, and descriptive statistics as appropriate.

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CRedit authorship contribution statement

Guglielmo Imbriaco: Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Nicola Ramacciati:** Writing – review & editing, Supervision, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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