SPIRIT 2013 Checklist (Full Version Adapted for Systematic Review)

This document provides the complete SPIRIT 2013 checklist, adapted for the protocol entitled 'The Challenge of Virtual Medical Emergency Education in Conflict Zones in Low- and Middle-Income Countries'. Although SPIRIT is designed for interventional trials, all 33 items have been tailored as applicable for a systematic review protocol.

Section	Item No.	Adapted Content for Systematic Review
Title	1	Descriptive title: Protocol for a Systematic Review and Meta-Analysis: The Challenge of Virtual Medical Emergency Education in Conflict Zones in Low- and Middle-Income Countries
Trial Registration	2a	PROSPERO registration number (CRD420251083001)
Trial Registration (WHO items)	2b	Not applicable
Protocol Version	3	Date and version identifier: [Not specified in the protocol; to be included in the final document]
Funding	4	No source of funds
Roles and Responsibilities	5a	Authors: Abbas Bazzal, Hadif Tounin, Aya Kawssan, Bsssel H Hoteit, Jobran Toami, Mahidi Akouch, Hiba Hamdar. Affiliations: Faculty of Medical Sciences, Lebanese University, Hadat, Lebanon; Medical Learning Skills Academy, Beirut, Lebanon; MEDICA Research Investigation, Hadat, Lebanon. Correspondence: Hiba Hamdar

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Sponsor Contact Information	5b	Not applicable
Sponsor Role	5c	Not applicable
Background and Rationale	6a	Rationale: Low- and middle-income countries (LMICs) face substantial barriers in healthcare delivery and medical education due to conflict, disrupting traditional in-person training. Virtual education has emerged as an alternative for emergency medical training, but its efficacy and accessibility in conflict zones are challenging. This review aims to assess current research, identify context-specific challenges, and suggest scalable solutions to close educational gaps.
Explanation for Choice of Comparators	6b	Comparison with traditional in-person training to evaluate the effectiveness and feasibility of virtual medical emergency education in conflict-affected LMICs
Objectives	7	Primary Objective: To estimate the pooled effect sizes (standardized mean differences) of virtual medical emergency education interventions on knowledge scores, skills assessments, and user satisfaction among healthcare professionals in conflict-affected LMICs. Secondary Objectives: To identify and thematically synthesize technical, infrastructural, and pedagogical barriers; to explore facilitators and enablers for successful

		implementation; to assess cost-effectiveness compared to in-person methods.
Trial Design	8	Systematic review and meta-analysis framework using PRISMA guidelines.
Study Setting	9	Studies conducted in conflict-affected LMIC settings.
Eligibility Criteria	10	Inclusion: Studies involving primary healthcare professionals, medical students, or emergency personnel in LMIC conflict zones; interventions involving virtual or online emergency medical education (e.g., trauma care, BLS/ALS, disaster response); outcomes including knowledge/skill gain, user satisfaction, and challenges (technical, infrastructural, pedagogical); study designs including RCTs, quasi-experimental, observational, qualitative, and mixed-methods studies; published in English, French, Spanish, or Arabic. Exclusion: Studies outside LMIC conflict zones, studies reporting in-person training only, or studies with poorly defined or irrelevant outcomes.
Interventions	11a	Virtual education interventions defined by type, duration, and delivery mode.
Intervention Adherence	11b	Not applicable to secondary data analysis.
Concomitant Care	11c	Not applicable.
Outcomes	12	Primary outcomes: Knowledge scores, skills assessments, user satisfaction. Secondary outcomes: Technical, infrastructural, and pedagogical barriers; facilitators and enablers; cost-effectiveness compared to in-person training
Participant Timeline	13	Not applicable.

Sample Size	14	Not applicable
Recruitment	15	Study selection from databases PubMed , Scopus, Web of Science and Embase
Allocation	16	Not applicable.
Blinding	17a	Not applicable.
Blinding - Outcome Assessment	17b	Not applicable.
Statistical Methods	20a	Random-effects meta-analysis using DerSimonian-Laird estimator for quantitative outcomes (e.g., knowledge scores, skills); narrative synthesis for qualitative data using the SWiM framework; heterogeneity assessed with I^2 statistic (0-24% low, 25-49% moderate, 50-74% substantial, 75-100% considerable)
Additional Analyses	20b	Subgroup analyses: conflict intensity/duration (using Uppsala Conflict Data Program categories), type of virtual platform (live, asynchronous, hybrid), type of learner (student, physician, first responder), region (e.g., Middle East vs. Sub-Saharan Africa). Sensitivity analyses: excluding high-risk-of-bias studies, small sample sizes, and varying data imputation methods
Analysis Population and Missing Data	20c	Data extraction will note missing values; corresponding authors will be contacted via email with a two-week response period; missing data reported as such; medians/ranges converted to means/SDs using established methods
Data Monitoring	21a	Not applicable.
Interim Analyses	21b	Not applicable.
Harms	22	Not applicable to systematic review.
Auditing	23	Not applicable.
Research Ethics Approval	24	Not required as this is a secondary analysis of published data.

Protocol Amendments	25	Any protocol changes will be updated in PROSPERO and final publication.
Consent or Assent	26a	Not applicable.
Confidentiality	27	Data will be anonymized and stored in line with FAIR principles.
Declaration of Interests	28	To be disclosed in final publication.
Data Access	29	All extracted data and scripts will be shared on open-access platforms.
Ancillary and Post-trial Care	30	Not applicable.
Dissemination Policy	31a	Results will be published in a peer-reviewed journal (specializing in global health, medical education, or emergency medicine)
Authorship Eligibility	31b	All contributors fulfilling ICMJE criteria will be listed.
Professional Writers	31c	None used.
Public Access	31d	Protocol and results will be accessible via PROSPERO and open-access journals.
Biological Specimens	33	Not applicable.