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Development of an Evidence-Based First Aid Guideline for First Responders in Sub-Saharan Africa

DESCRIPTIVE MANUSCRIPT

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ABSTRACT

Background: Many Sub-Saharan African countries lack effective emergency medical services. In response, Red Cross and Red Crescent National Societies, amongst other organizations implement first responder training programs across Africa. The current paper describes the development of an advanced manual for first responders (FAFR) in Sub-Saharan Africa.

Methods: This FAFR manual was developed according to the principles of Evidence-Based Practice accounting for scientific evidence, expert opinion, and preferences of the target audience (i.e., Sub-Saharan African first responders). The GRADE (Grading of Recommendations Assessment, Development, and Evaluation) approach was used to assess the certainty of evidence. A geographically balanced expert panel of African field and academic experts set the scope and defined the research questions. The best available evidence was systematically collected and presented to independent and dedicated content writers, drafting the manual. The expert panel discussed these draft recommendations during a two-day meeting and validated the final version of the manual.

Results: The systematic literature addressed 87 research questions. Of these, 52 could be supported by scientific evidence, in thirteen cases by a Cochrane systematic review. We determined the GRADE certainty of the evidence as low (38%) or very low (53%). Where no evidence was found, good practice points were formulated based on expert opinion.

Conclusions: The FAFR manual is used by Red Cross and Red Crescent National Societies across Africa and will be updated every five years by the Belgian Red Cross. The manual is freely available to anyone interested (https://www.rodekruis.be/en/what-do-we-do/first-aid-and-support/first-aid-for-first-responders/).

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SELECTION OF TOPICS

The topics to be discussed in the FAFR manual were determined by the expert panel, based on local needs and structured according to the didactic ABCDE (airway-breathing-circulation-disability-exposure) approach of patient assessment (Thim et al., 2012). During a conference call in November 2018, the table of content was finalized, and research questions were developed. The emergent topics included in the guideline were the following: "the role of the first responder," "approaching a seriously ill or injured person," "gathering information about an illness or injury," "basic life support," "airway and breathing," "circulation (management of bleedings)," "damage and disability," "road traffic accidents," "common illnesses and diseases," "safe movement and transport of the ill or injured," "incident management and support," "disasters and the first responder," and "prevention of illness and injury."

SYSTEMATIC LITERATURE REVIEW

Search strategy

Within each topic, the expert panel decided whether scientific evidence was needed to inform practical recommendations. Research questions were defined in PICO (Patient-Intervention-Comparator-Outcome) format. For each PICO question, a systematic literature search was conducted in three databases: Medline (via the PubMed.com interface), Embase (via the Embase.com interface), and the Cochrane Library (Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Trials), from the date of database inception up to the date of the search (ranging from December 2018 to March 2019). The search strings used were a combination of index terms (MeSH terms in PubMed and the Cochrane Library and Emtree terms in Embase) and free text words. Some PICO questions were already addressed during the development of prior first aid guidelines (Borra et al., 2016; Laermans et al., 2018; Van de Velde et al., 2011). In these cases, the preexisting literature searches were updated. For all included studies, reference lists and related citations in PubMed were screened for additional relevant studies.

In some cases, it was decided not to address practical issues with a research question. This happened when issues were considered good practice points (GPPs, statements that likely have no evidence base, but on which the expert panel agrees, and nobody is likely to question) or common sense, for issues relating to anatomy/physiology, for issues where legal aspects apply (e.g. whom to inform when someone has died), or when issues describe the practical organization of activities (e.g. description of command and control systems). In case a PICO question was addressed in the 2016 resuscitation and first aid guidelines of the International Liaison Committee on Resuscitation (ILCOR) (Monsieurs et al., 2015), the evidence reviews and recommendations made by ILCOR were presented to the expert panel.

Study Selection

For each PICO question, relevant studies were selected according to formal selection criteria by a single reviewer (BA, JL, HVR, AV, or EDB). Table 1 describes the general selection criteria that applied to all investigated PICO

CRITERIA DOMAIN	CRITERIA APPLIED
Study design	Existing systematic reviews were included if they were up to date (less than 5 years old from the date of screening), searched more than one database, and clearly described the selection criteria used. Furthermore, experimental research with any of the following study designs was eligible: (quasi or non-) randomized controlled trials, controlled before-after studies, and controlled interrupted time series. Observational research was considered eligible in the case of the following study designs: controlled cohort studies or case-control studies, controlled before-after studies or controlled interrupted time series.
Language	Only studies in English were considered.
Date of publication	No restrictions were applied regarding the date of publication.
Population	The population was defined by the P component of the PICO question investigated, without geographical restrictions.
Intervention	The interventions studied needed to relate to the priority topics selected by the expert panel (see "Selection of Topics"), with a focus on physical health. Mental health topics were not within the scope of this manual. To be included, interventions needed to be feasible to be performed by laypeople and the required materials were to be readily available to first responders. Studies in health professionals were eligible, given that the intervention investigated was judged to be feasible for first responders. Additional PICO-specific selection criteria were applied.
Comparison	Researched interventions could be compared to either no intervention or another intervention feasible for and available to first responders.
Outcome	Studies reporting health-related outcomes were considered eligible. Pure performance or process outcomes (e.g., number of patients treated) were not selected.

Table 1 Formal criteria were applied to select studies with relevance to the defined research questions, complemented with PICO-specific selection criteria.

questions, in addition to PICO-specific criteria. Studies were first assessed for eligibility at the title-abstract level. For potentially eligible records, the full-text paper was retrieved and assessed using the same selection criteria as described above.

Data Extraction

For each PICO, data from identified studies were collected in an evidence summary in tabulated form, according to an *a priori* designed and tested evidence summary template. For each study, characteristics of the study, including study design, population, comparisons made, and outcomes assessed were extracted. The outcomes were preferentially presented using effect sizes: mean differences with 95% confidence intervals for continuous data and risk ratios with 95% confidence intervals for dichotomous data. If not present in the original publications, these were calculated using Review Manager Version 5.0 (The Nordic Cochrane Centre, Copenhagen, Denmark) (The Nordic Cochrane Centre, 2014) or R Version 3.4.0 (R Core Team, Vienna, Austria) (R Core Team, 2016). Where possible, data from individual studies were combined into a single pooled effect estimate via a meta-analysis.

Quality Assessment

The credibility of the data presented in the evidence summary was assessed in a two-step process, using the guidance of the GRADE working group (GRADE working group, 2013), described briefly below.

First, the risk of bias was assessed at the individual study level across several bias domains. For experimental studies, the following bias domains were assessed: selection bias (appropriateness of randomization and allocation concealment), performance bias (appropriate blinding of providers and patients), detection bias (appropriate blinding of outcome assessors), attrition bias (level of loss to follow-up), reporting bias (likeliness of selective outcome reporting) and other bias. For observational studies, the following bias domains were assessed: selection bias (appropriateness of eligibility criteria), appropriateness of methods used for measurement of exposure and outcome, correction for confounding, attrition bias (level of loss to follow-up), and other biases.

Secondly, the level of certainty was determined across studies, which can be high, moderate, low, or very low (GRADE working group, 2013). Data originating from experimental studies are considered to have an initial high certainty level, whereas data originating from observational studies are considered to have an initial low certainty level. The certainty of the identified evidence can then be downgraded across five domains: risk of bias in the individual studies, indirectness (whether the evidence is of direct relevance to the PICO question), inconsistency (whether data from different studies contributing to outcomes conflict), imprecision (whether the effect estimate is precise, as reflected by the sample size and several events, width of the 95% confidence intervals around the estimate and the availability of sufficient information to assess the previous two criteria) and publication bias. For observational research, the certainty of evidence can also be upgraded in case the observed effect is large, there is a dose-response effect, or any confounding factors are likely to counteract the observed effect.

FORMULATION OF DRAFT RECOMMENDATIONS

The evidence summaries were prepared in the period December 2018 – March 2019, and presented to professional content writers, with extensive expertise in prehospital first aid and first aid training. Based on the identified evidence and their own practical experience they formulated draft recommendations. In case no evidence could be identified, the content writers formulated draft GPPs. The draft recommendations/GPPs and evidence summaries were sent out to the expert panel for revision, accompanied by point-by-point questions from the content writers. Written feedback from the expert panel was summarized and used as a basis for discussions during the consensus conference.

CONSENSUS METHOD

During a two-day consensus conference in March 2019, the expert panel discussed the evidence summaries and accompanying draft recommendations/GPPs. In case of controversies, the panel's discussion was structured along the following elements of the GRADE Evidence-to-Decision (EtD) framework (Alonso-Coello, Oxman, et al., 2016; Alonso-Coello, Schunemann, et al., 2016): benefits of the intervention, harms of the intervention, certainty of the evidence, the balance between benefits and harms, stakeholder values, acceptability and feasibility of the intervention. For benefits and harms of the intervention and certainty of the evidence, the experts could rely on the evidence summaries. For stakeholder values, acceptability and feasibility of interventions, and the balance between benefits and harms, they had to rely on their own experience. Consensus was reached through informal discussion, with the possibility of anonymous 50% majority voting in case no consensus could be reached. In case of a tie, the vote of the expert panel's chair would be deciding. In addition to formulating recommendations and GPPs, the expert panel asked for additional evidence summaries on several topics.

FINALIZATION OF THE MANUAL

Based on the final recommendations and GPPs made by the expert panel and the additional evidence summaries developed, the content writers completed a revised

version of the manual in May 2019. The expert panel revised and approved the final version of the manual during a conference call.

RESULTS

RESULTS OF THE SEARCHES AND STUDY CHARACTERISTICS

A total of 120 PICO questions were listed. For 33 questions, the experts were provided with evidence reviews and recommendations made in the 2016 resuscitation and first aid guidelines by ILCOR. For the remaining 87 PICO questions, systematic literature reviews were performed. Of these, 33 were new PICO questions, whereas 54 were updates of preexisting searches.

In total, 35936 potentially relevant records were retrieved (Figure 1). After screening at the title-abstract level, 967 full-text papers were assessed for eligibility. The evidence summaries were supported by 263 publications, which corresponds to an average of 3 (standard deviation 5, range 0–22) relevant publications per evidence summary. Only 3% of these publications concerned research conducted in Africa. There were three papers conducted in Nigeria (Ahidjo et al., 2011; Mezue et al., 2013; Uneke et al., 2014), two papers conducted in South Africa (Hoppe et al., 2015; Kielblock et al., 1986), two papers conducted in Congo ("Ebola haemorrhagic fever in Zaire, 1976," 1978; Roels et al., 1999), one paper conducted in Guinea-Bissau (Gunnlaugsson et al., 1998) and one paper conducted in Uganda (Ndyomugyenyi et al., 2016). The majority of studies identified were conducted in high-income countries in North America (51%), Europe (30%), and Oceania (6%). The remainder were studies from Asia (9%) and South America (1%).

Out of 87 PICO questions, 55 were supported by evidence, and in 15 cases one or more Cochrane reviews. A total number of 13 Cochrane reviews was used to substantiate this manual. For PICOs where evidence was identified, this originated from randomized experimental research in a majority of cases (51%). Nevertheless, when rating the GRADE certainty of the evidence, the vast majority was of low (38%) or very low (53%) certainty. Major reasons for downgrading evidence were imprecise results, indirect evidence, and risk of bias.

For the remaining 32 PICO questions (37%), no scientific literature meeting our eligibility criteria was found. Topics, where evidence was most lacking, were "Damage and disability," with evidence lacking for 60% of PICO questions, and "Circulation (management of bleedings)," with evidence lacking for 54% of PICO questions. For PICO questions without evidence, recommendations for practice were GPPs, relying fully on expert input.

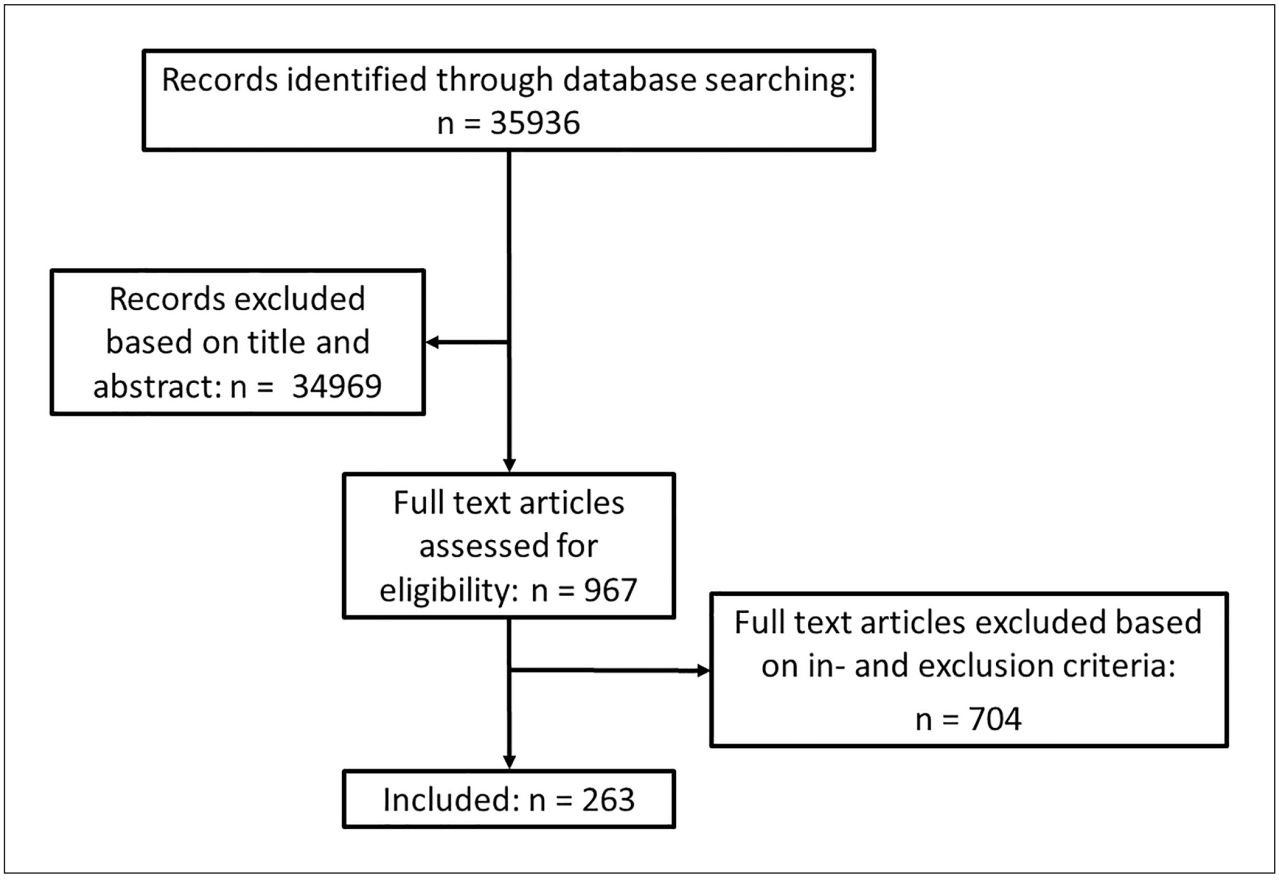

Figure 1 Overview of study selection for all 87 PICO questions together.

Below, two examples are described in more detail, including a PICO question for which evidence was available and a PICO question for which GPPs were formulated.

Detailed Example 1: Transport of a Victim with Potential Spine Injury in a Car or on a Motorcycle

Given the lack of formalized EMS services in many African countries, people with illnesses and injuries that need transport to a hospital have to rely on relatives or bystanders, using regular vehicles such as passenger cars, public transportation, or even motorcycles, instead of equipped ambulances (Ahidjo et al., 2011; Delaney et al., 2018; Mezue et al., 2013). Therefore, a question that was raised by the expert panel during the kick-off meeting of this project was whether there is scientific evidence regarding the most appropriate (or least harmful) method for transporting a person with a potential spine injury in the absence of an ambulance. The following corresponding PICO question was composed: "In humans with a possible spinal injury (P), is a certain method to transport them in a car/on a motorcycle (I), compared to another method to transport them (C), more effective to change survival, functional recovery, pain, complications, or time to resolution of symptoms (O)?"

Three relevant papers were identified (Ahidjo et al., 2011; Ghajarzadeh & Saberi, 2019; Mezue et al., 2013), of which the characteristics are presented in Table 2. Briefly, it concerns observational studies conducted in Nigeria (Ahidjo et al., 2011; Mezue et al., 2013) and Iran (Ghajarzadeh & Saberi, 2019), investigating cohorts of patients with spinal cord injury, admitted to emergency departments. The studies investigated whether certain features, including method of transportation, were predictive of mortality, length of hospital stay, the severity of the spinal injury, lasting dependence, and complications.

A first Nigerian study found that transportation of spinal injury victims in a crouched position, compared to transportation while not in a crouched position, was significantly associated (adjusted Odds Ratio 23.52, 95%CI [7.26;74.53]; $p = 0.001$) with increased mortality within 6 weeks (Ahidjo et al., 2011). The second Nigerian study found that transport while sitting, as compared to lying down, was significantly associated (Risk Ratio 2.11, 95%CI [2.11;2.95]; $p < 0.0001$) with severe lasting dependence upon hospital discharge (Mezue et al., 2013). In the Iranian study, which compared transport in an ambulance to a non-equipped car, significant differences in spinal injury severity, length of hospital stay, or the development of pressure ulcers or sepsis

AUTHOR, YEAR, COUNTRY	STUDY DESIGN	POPULATION	COMPARISON/RISK FACTOR	REMARKS
Ahidjo, 2011, Nigeria (Ahidjo et al., 2011)	Observational: Prospective cohort study	168 patients with spinal cord injury, admitted for >6 weeks, at one of two Nigerian referral hospitals during the year 2009 (149 male and 19 female, 36.4 (12.7) years).	Predictors of mortality: 1) Age 2) Gender 3) Transfer by bystanders 4) Commercial bus transport 5) Crouched position during transfer 6) Presentation >24 h 7) Multiple hospital presentations [Only data on crouched position was extracted]	
Ghajarzadeh, 2019, Iran (Ghajarzadeh & Saberi, 2019)	Observational: Retrospective cohort study	Records of 830 patients with established traumatic spinal cord injury (674 male and 156 female, 36.9 (11.5) years) treated at a brain and spinal injury research centre between March 2013 and May 2017 were reviewed.	Transportation to the hospital with either an equipped ambulance or a non-equipped car	Spinal injury was assessed according to the criteria of the American Spinal Injury Association (ASIA)
Mezue, 2013, Nigeria (Mezue et al., 2013)	Observational: Prospective cohort study	68 consecutive road traffic accident patients presenting to one of two neurosurgical centres (53 male, 15 female, 33.9 (range 15–69) years) in Southeast Nigeria with an unstable spine injury and consciousness at the scene were questioned about the method of transport.	Vehicle of transport: 1) Ambulance 2) Van 3) Car 4) Motorcycle 5) On foot Mode of transport: 1) Lying 2) Sitting	Outcome scale (Spinal Cord Independence Measure) was presented in 4 categories by the authors (0–25, 25–50, 50–75, and 75–100), and was dichotomized by the reviewer for ease of interpretation (<50 vs >50)

Table 2 Characteristics of included studies for an evidence review on methods for transporting victims with a potential spinal injury.

could not be demonstrated (Ghajarzadeh & Saberi, 2019). In contrast, the second Nigerian study demonstrated a harmful association between transport in a car or on a motorcycle, compared to transport in an ambulance, on severe lasting dependence upon discharge (Mezue et al., 2013). Furthermore, a statistically significant association between walking or transport in a van, compared to transport in an ambulance, could not be demonstrated. Detailed findings from the studies are presented in Table 3.

OUTCOME	RISK FACTOR	EFFECT SIZE	#STUDIES, # PARTICIPANTS	REFERENCE
Mortality within 6 weeks	Crouched position vs no crouched position	Statistically significant: 16/60 vs x/108 £§ aOR: 23.52, 95%CI [7.26;74.53] (p = 0.001) *With harm for crouched position*	1, 60 vs 108	Ahidjo, 2011 (Ahidjo et al., 2011)
Severe spinal injury (ASIA level A)	Non-equipped car vs ambulance	Not statistically significant: 222/339 vs 315/491 RR: 1.02, 95%CI [0.929;1.13] *¥ (p = 0.69)	1, 339 vs 491	Ghajarzadeh, 2019 (Ghajarzadeh & Saberi, 2019)
Development of pressure ulcers		Not statistically significant: 96/339 vs 125/491 RR: 1.11, 95%CI [0.89;1.40] *¥ (p = 0.36)		
Development of sepsis		Not statistically significant: 1/339 vs 6/491 RR: 0.24, 95%CI [0.03;2.00] *¥ (p = 0.19)		
Length of hospital stay (days)		Not statistically significant: 26.6 (49) vs 25.2 (38.1) MD: 1.40, 95%CI [−4.81;7.61] * (p = 0.66)		
Severe lasting dependence upon discharge (Spinal Cord Independence Measure <50 on a scale from 0 to 100, higher is better)	Van vs ambulance	Not statistically significant: 4/17 vs 0/8 § RR: 4.50, 95%CI [0.27;74.75] *¥ (p = 0.29)	1, 17 vs 8	Mezue, 2013 (Mezue et al., 2013)
	Car vs ambulance	Statistically significant: 32/35 vs 0/8 § RR: 16.25, 95%CI [1.10;240.79] * (p = 0.04) *With harm for car*	1, 35 vs 8	
	Motorbike vs ambulance	Statistically significant: 7/7 vs 0/8 § RR: 16.88, 95%CI [1.13;251.01] * (p = 0.04) *With harm for motorcycle*	1, 7 vs 8	
	Walking vs ambulance	Not statistically significant: 1/1 vs 0/8 § RR: 13.50, 95%CI [0.81;224.24] *¥ (p = 0.07)	1, 1 vs 8	
	Sitting vs lying	Statistically significant: 23/24 vs 20/44 § RR: 2.11, 95%CI [1.51;2.95] * (p < 0.0001) *With harm for sitting*	1, 24 vs 44	

Table 3 Synthesis of findings for an evidence review on methods for transporting victims with a potential spinal injury.

Mean (SD) (unless otherwise indicated), MD: mean difference, RR: Risk Ratio, aOR: adjusted Odds Ratio, 95% CI: 95% confidence interval.

* Calculations (RR and 95%CI) done by the reviewers using Review Manager.

£ No number of events available for the control group.

¥ Imprecision (large variability of results).

§ Imprecision (low number of events).

The overall GRADE certainty of evidence across outcomes and studies was very low. The three identified studies were observational research, which starts at a low certainty level. The certainty was downgraded further because of the risk of bias and imprecise results.

The expert panel interpreted the evidence along the GRADE EtD framework. Despite the very low certainty of the evidence, the panel considered the potential harms of a sitting position (as identified from the evidence) during transportation of patients with a potential spinal cord injury to outweigh the potential benefits (possibility to use a seat belt). A recommendation in favor of a lying down position would likely be acceptable and feasible for the stakeholders (patients, first responders, healthcare professionals taking over) involved. No specific variations or uncertainty in how stakeholders would value the main outcomes were suspected. Based on these considerations, the expert panel decided to make the following recommendation for practice regarding the transportation of victims with a possible spine injury: "If it is likely the person has a spinal injury, they must be transported in a lying down position." Furthermore, a note was added, to emphasize that own transport should not replace transport in an ambulance if available: "In optimal circumstances, this would be undertaken by an appropriately equipped ambulance. In practice, however, it is recognized that the mode of transport will be determined by resources, training, and other situation-dependent factors." The expert panel decided not to make a recommendation on transport using a motorcycle, given the potential harms associated, but the likelihood that people sometimes have no other option.

Detailed Example 2: Management of an Open Chest Wound

Management of open chest wounds was considered a priority by the expert panel, given the relatively high prevalence in African countries resulting from, amongst others, motor vehicle accidents or interpersonal violence (Adem et al., 2001; Ali & Gali, 2004; Okugbo et al., 2012). ILCOR already investigated the use of occluding, compared to non-occluding dressings, for its 2016 first aid guidelines (Monsieurs et al., 2015). They recommended against the use of occluding dressings, based on a study in a swine model, which suggested that occlusive dressings may lead to tension pneumothorax (Kheirabadi et al., 2013). The expert panel, therefore, wondered whether, in a first aid setting, a non-occlusive dressing (commercial or non-commercial) should be recommended, which resulted in the following PICO question: "In humans with an open chest wound (P), does using a non-occlusive dressing (I), compared to no dressing (C), change survival, functional recovery, pain, complications, time to resumption of usual activities, restoration to the pre-exposure condition, time to resolution of symptoms or other health outcome measures (including adverse effects) (O)?

A systematic search yielded no relevant evidence, for which the expert panel had to rely on its own practical experience, taking into account the factors of the GRADE EtD framework, for making practical recommendations. Given the absence of evidence, they concluded that it was uncertain whether the potential benefits of a non-commercial non-occlusive dressing (avoiding infection and bleeding control) would outweigh the potential harms (development of an occlusive dressing and tension pneumothorax due to soaking). As the resource requirement of commercial non-occlusive dressings was considered very high for the African context, the acceptability of these devices was judged to be variable. Both commercial and non-commercial non-occlusive dressings were considered feasible to be applied by laypeople. Based on these considerations, the following recommendations were formulated: "If you have one, use a specialized/commercial chest seal to cover the hole. If a specialized chest seal is not available, and if there is severe bleeding, cover the wound with a gauze dressing. Do NOT let the dressing seal the wound completely. Replace the dressing if necessary. If it is limited or no bleeding, leave the wound uncovered."

DISCUSSION

This paper describes the development of a first aid for first responders (FAFR) manual, tailored to the Sub-Saharan African context, according to the principles of EBP. This manual aims to contribute to existing and future efforts to set up effective first responder systems across Sub-Saharan Africa and has several strengths. The application of the rigorous method of EBP ensures that the recommendations made are based on the best available scientific evidence but contextualized by experts in the field and aligned with the target audience's preferences. To our knowledge, this evidence-based advanced first aid manual is the first of its kind developed specifically for the Sub-Saharan African region. The involvement of a multidisciplinary panel of experts, with extensive experience in the field, adds to the credibility and appropriateness of a manual in a field where scientific evidence is scarce. The fact that the end-users of this product were involved in its development increases the chances of successful implementation.

Limitations of this project include the lack of evidence to support several recommendations. In the field of emergency medicine and first aid, evidence is often limited or indirect, due to the nature of the emergency setting, where conducting experimental research is inconvenient. Major gaps in research were identified for the topics "Management of Bleeds" and "Damage and Disability". Most practical recommendations for these

topics were GPPs, solely based on the experience of the expert panel. Additional research on these topics would benefit future updates of the FAFR manual.

The fact that only a minority of the identified evidence was African means that our expert panel needed to assess the applicability of research findings in the African context. In addition, one might argue that contextualizing a manual to the whole of Sub-Saharan Africa is a second limitation. The following measures were taken to mitigate this issue: firstly, priority topics that apply to the whole of Sub-Saharan Africa were selected, including for instance the topics that relate to motor vehicle incidents (scene safety, trauma, transport, ...). Secondly, for some topics, such as disaster response, generic information was given, which can be further elaborated with country-specific information during training by the RC National Societies who are the end users of this manual.

In conclusion, this paper describes the development of an advanced first aid manual for first responders in Sub-Saharan Africa. This FAFR manual is used during first responder training by RC National Societies across Sub-Saharan Africa. In addition, the FAFR manual is freely available to anyone interested and will be updated five-yearly (https://www.rodekruis.be/en/what-do-we-do/first-aid-and-support/first-aid-for-first-responders/).

DATA ACCESSIBILITY STATEMENT

The evidence summaries supporting the FAFR manual can be consulted freely from the CEBaP First Aid Evidence Summary Database (https://www.cebap.org/knowledge-dissemination/first-aid-evidence-summaries/). The full FAFR manual is freely available from the Belgian Red Cross African First Aid Materials website (https://www.rodekruis.be/en/what-do-we-do/first-aid-and-support/first-aid-for-first-responders/).

ABBREVIATIONS

AFAM: African First Aid Materials
AGREE II: Appraisal of guidelines for research & evaluation II
EBP: Evidence-Based Practice
EMS: Emergency Medical Services
EtD: Evidence-to-Decision
DALY: Disability-Adjusted Life Year
FAFR: First Aid for First Responders
GPP: Good Practice Point
GRADE: Grading of Recommendations Assessment, Development, and Evaluation
ILCOR: International Liaison Committee on Resuscitation
PICO: Patient-Intervention-Comparator-Outcome
RC: Red Cross and Red Crescent
WHO: World Health Organization

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COMPETING INTERESTS

The authors have no competing interests to declare.

AUTHOR CONTRIBUTIONS

BA and JS coordinated the project. BA, JS, EDB, HG, and NN participated in the expert panel meetings. BA, EDB, JL, HVR, and ACV prepared evidence summaries. EDB and PV conceptualized the research. All authors read and approved the final manuscript.

AUTHOR INFORMATION

BA, JS, JL, HVR, ACV, EDB, and PV are employees of the Belgian Red Cross. One of the activities of the Belgian Red Cross is providing first aid training to laypeople in Belgium and supporting African Red Cross and Red Crescent National Societies in the development of first aid materials.