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SHORT REPORT

Emergency medical services (EMS) training in Kenya: Findings and recommendations from an educational assessment

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ABSTRACT

Background: Over the past twenty years, Kenya has been developing many important components of a prehospital emergency medical services (EMS) system. This is due to the ever-increasing demand for emergency medical care across the country. To better inform the next phase of this development, we undertook an assessment of the current state of EMS training in Kenya.

Methods: A group of international and Kenyan experts with relevant EMS and educational expertise conducted an observational qualitative assessment of Kenyan EMS training institutions in 2016. Three assessment techniques were utilised: semi-structured interviews, document review, and structured observations. Recommendations were reached through a consensus process amongst the assessment team.

Results: Key findings include: (i) No national or state-level policy exists that establishes levels of EMS providers or expected fund of knowledge and skills; (ii) Training institutions have independently created their own individual training standards; (iii) Training materials are not adapted for the local context; (iv) The foundation of basic anatomy and physiology education is weak; (v) Training does not focus on symptom- or syndrome-based complaints; (vi) Students had difficulty applying foundational classroom knowledge in simulations and clinical encounters; (vii) There is limited emphasis on complex critical thinking.

Discussion: Standardisation of training is needed in Kenya, including clearly defined levels of providers and expected learning outcomes. A nationally standardised EMS provider scope of practice may also help focus EMS education. Instructors must reinforce basic anatomy and physiology amongst all trainees to establish a robust foundation, then layer on field experience before trainees receive advanced training. Training graduates should be EMS providers who approach patient care with high-order symptom- or syndrome-based critical thinking. While these recommendations are specific to the Kenyan EMS environment, they may have wider applicability to other developing EMS systems in resource-limited settings.

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African relevance

- Prehospital care systems are in multiple phases of development across the African continent.
- Little is known about the strengths and weaknesses of Kenyan emergency medical services (EMS).
- The education of Kenyan EMS providers has not previously been systematically evaluated.

Introduction

Kenya has an undisputed and strong need for robust prehospital emergency care. The high prevalence of acute medical events, natural and man-made disasters, and mass casualty incidents has created an increasingly large demand for a reliable, integrated, and safe emergency medical services (EMS) system [1,2].

Over the past twenty years, EMS systems have developed in Kenya, as have institutions to train EMS providers [3]. Currently, two separate EMS training programmes are offered in Kenya: the Kenya Red Cross Training School and the Kenya Council of Emergency Medical Technicians [4,5]. Two levels of EMS providers exist in Kenya: Emergency Medical Technician-Intermediate and Paramedic. Their level of training varies based on their educational

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background. Effective training is critical to producing quality providers who can provide quality services and advance the profession. A robust evaluation of existing EMS training programmes in Kenya may augment the quality, effectiveness, and efficiency of these programmes.

The objective of this assessment was to appraise Kenyan EMS training programmes in the context of the local burden of acute disease, the healthcare system, existing resources, and anticipated national EMS expansion. Our aim was to provide recommendations to optimise EMS training in Kenya.

Methods

A qualitative assessment of Kenyan EMS education was conducted in July and August 2016 by external assessors with expertise in African and international EMS systems and education. The assessment was primarily of Kenya's main EMS training institutions and EMS agencies. Study investigators developed standardised forms and interview guides *a priori* through discussion and consensus. Main domains in interview guides included providers' perceived strengths and weaknesses of their prehospital training and clinical care. Key categories in observation forms included strengths and weaknesses of practical, classroom, and clinical instruction, and adequacy of providers' prehospital management.

Data were directly collected by study investigators using three techniques: key personnel interviews, direct observations, and document review. Semi-structured one-on-one interviews were conducted with 20 total trainees, instructors, and senior staff within three EMS training institutions. Approximately 60 h of total standardised observations were conducted in clinical and classroom training environments and in ambulances during live clinical care. Training organisations provided relevant training and testing documentation for review, and several EMS agencies provided equipment checklists. Combined, these approaches allowed a detailed understanding of context, rationale, structure, function, and outputs of the EMS training institutions. All agencies, respondents, and data were de-identified.

Final recommendations were made through discussion, ranking, and consensus-building amongst the study investigators using a modified Delphi approach. Two internationally-accepted standard educational theories were incorporated to help contextualise the findings: Kirkpatrick's Four-Level Training Evaluation Model (to assess educational impact) and Bloom's Taxonomy of Educational Objectives (to categorise complexity of educational goals) [6,7].

This study received ethical approval from Boston Medical Center (USA) and all participating organisations in Kenya.

Results

Per stakeholder interviews, the EMS scope of practice in Kenya is defined at the individual ambulance agency level. No national- or state-level policy exists to establish or standardise levels of EMS providers, nor the repertoire of knowledge and skills within existing emergency medical technician or paramedic levels.

Per stakeholders and from document review, Kenyan EMS training institutions have individually defined the breadth and depth of training content, and employed their own training standards.

Per document review, training materials and content, including slides, books, and practical simulations, are from non-Kenyan sources. Testing materials cover non-Kenyan EMS system facts and issues. This subtly degrades the quality of EMS training, is inappropriate for EMS learners in Kenya, and wastes training resources.

Per individual interviews, EMS students consistently reported discomfort with developing care plans for medical chief complaints, largely due to difficulty in formulating simple symptom-

or syndrome-based differential diagnoses. Conversely, EMS trainees overestimated their knowledge and confidence in trauma care, compared to reports on knowledge and proficiency described by EMS leaders and trainers.

Per review of examinations and from individual interviews, students struggled with understanding basic anatomy and physiology (Bloom lower-order). This results in difficulty in applying this content clinically (Bloom middle- and high-order).

Per observation and according to EMS trainers interviewed, students had difficulty applying foundational classroom knowledge to patient simulations and practical stations (Bloom middle-order). Learning and behaviour changes during the ambulance and hospital clinical experiences are not assessed (Kirkpatrick levels 2 and 3).

Per observation, and from interviews with emergency physicians and leaders, there is limited emphasis on complex critical thinking skills beyond reciting facts and understanding basic concepts (Kirkpatrick levels 1 and 2). Consequently, students struggle with applying classroom knowledge to practical clinical stations (Bloom middle- and high-order).

Discussion

Primary recommendations

Standardising the Kenyan EMS scope of practice: A standard Kenyan EMS scope of practice (document and policy) is needed that clearly defines standard levels of EMS providers, and delineates all knowledge, skills, and competencies required to practice at a given level. This document should explicitly define: (i) the various levels of EMS providers; (ii) training and qualifications required to attain those levels; (iii) standardised minimum and maximum expected knowledge, skills, and core competencies for each level.

Creating a national standard for EMS training in Kenya: A standard for EMS training should be developed and implemented to help ensure high quality, uniform EMS training across institutions that aligns with the Kenyan EMS scope of practice. Standards for EMS training in Kenya can establish the minimum and maximum content of training for each tier of EMS provider. Aligning EMS training curricula and content to scopes of practice will likely minimise costly over-training, or dangerous under-training.

Adapting foreign training content to Kenya: There should be a transition from over-reliance on non-Kenyan curricula and training content, to Kenya-specific materials that are relevant to the local burden of disease, healthcare system, and available resources. Kenyan EMS educators have requisite qualifications and expertise to adapt content.

Focus on symptom- or syndrome-based training: Instructors should increase the time spent on the general approach to medical symptoms and decrease emphasis on distinct diseases (Bloom middle- and high-order). We suggest a shift in Kenyan EMS training culture away from diagnosis-based training to syndrome- and/or symptom-based training.

Improve foundational didactic/classroom-based education: EMS trainees will likely benefit from stronger foundational didactic classroom-based education with a specific focus on clinically relevant basic anatomy and physiology aligned to the Kenyan burden of disease (Bloom lower-order). Further, as EMS students come from a wide spectrum of prior education, it is important to ensure that basic knowledge and skills are equilibrated amongst all learners in a given tier.

Improve foundational clinical thinking: We recommend trainees first achieve competencies and attain adequate field clinical experience at a basic level, before receiving additional training to higher

qualifications (e.g. ILS or ALS). Hence, a basic course should be established as the initial course for all providers. Additionally, middle- and high-order thinking should be robust and formally assessed during clinical experiences.

Improve (Bloom) high-order and critical thinking skills: Higher-order and critical thinking skills need to be developed, by integrating basic knowledge and skills into real-world clinical scenarios that are included in all aspects of EMS training and evaluation programs. Kenyan instructors should continue to use mixed methods (qualitative and quantitative) to assess learners' higher-order thinking and more integrated thought processes (Kirkpatrick 3 and 4).

Secondary recommendations

Primary course instructors (i.e. those who instruct at least fifty percent of the course) must be experienced and currently licensed as an instructor and above the qualification level of instruction.

EMS training institutions should maintain a written clinical training agreement with a licensed medical facility, ambulance service, and physician medical director (with requisite knowledge of emergency medicine or EMS).

Upon completion of training, EMS providers should be certified as ready-for-independent-practice through a standardised process that includes a certificate of graduation from an EMS training institution and passing a standardised external exam. EMS service agencies should internally prepare certified EMS providers to enter their workforce through a credentialing process. This should include certificate verification, an on-boarding process, and a supervised assessment period by a medical director or field-training officer.

Since critical knowledge and skills are known to decay rapidly, it is imperative that EMS agencies provide ongoing training opportunities to improve knowledge and skills retention [8].

The local Kenyan prehospital burden of disease needs to be better established to aide in tailoring of training towards the Kenyan environment.

Conclusions

Several recommendations are offered to assist improving quality of Kenyan EMS training, including developing a national EMS scope of practice document, tailoring training to Kenyan epidemiology, improving critical thinking skills, and focusing on symptom- and syndrome-based patient care. We recommend that EMS agencies introduce more structured continuous medical education/professional development and processes for credentialing and recertifying providers. Overall, the EMS environment in Kenya is thriving and expanding. Sustained high-quality training of EMS

providers will be critical to the continued growth and professionalisation of EMS in Kenya.

Conflict of interest

Ben Wachira is an editor of AfJEM. He was not involved in editing or peer review for this paper. The authors have no further conflicts of interest to declare.

Dissemination of results

Results from this assessment have been summarised in a white paper and presented to relevant members of the prehospital community in Kenya including prehospital agencies and the primary organisations that have developed Kenyan EMS training programmes.

Author contributions

BN and CM carried out the assessment in the field and contributed to the manuscript. BW was involved in the study idea and design and provided introductions to members of the organisations. NM conceived the idea, developed the assessment framework and methodology, contributed to the manuscript, and served as the senior advisor to the project. All authors approved the final version for submission.

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