Emergency medicine development in Ethiopia: Challenges, progress and possibilities

Développement de la médecine d’urgence en Ethiopie: défis, progrès et possibilités

Fikre Germa a,*, Tesfaye Bayleyegn b, Tsegazeab Kebede c, James Ducharme d, Kidist Bartolomeos e

a Brantford General Hospital Emergency Department, Brantford, Ontario, Canada
b Lilburn, Atlanta, Georgia, United States
c Kampala, Uganda
d Faculty of Health Sciences, McMaster University, Hamilton, Ontario, Canada
e Department of Injury and Violence Prevention, World Health Organization, Geneva, Switzerland

Received 30 April 2012; revised 6 July 2012; accepted 29 August 2012
Available online 16 October 2012

KEYWORDS
EMS; Ethiopia; Emergency medicine; EM development; EM training

Abstract Ethiopia does not have the facilities, equipment and human resource with the essential skills to support a coordinated emergency medical care system and as such lacks the basic infrastructure for delivering emergency care. The country has made significant improvements in the last two decades, particularly with regard to training of key Emergency Medical personnel. Nevertheless, much remains to be done, and numerous opportunities exist to make additional improvements in both the short and long term. This article provides a historical overview of the development of emergency medicine in Addis Ababa, Ethiopia, critically examines the specific challenges faced and presents the various efforts over the past several years by national and international partners trying to address these challenges. It describes what has been achieved and proposes key recommendations

* Corresponding author. Tel.: +1 519 717 2991.
E-mail address: fikregerma130@hotmail.com (F. Germa).
Peer review under responsibility of African Federation for Emergency Medicine.

Production and hosting by Elsevier

2211-419X © 2012 African Federation for Emergency Medicine. Production and hosting by Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.afjem.2012.08.005
for further improvement and scaling-up of Addis Ababa, emergency medical services initiative to other regional states of Ethiopia.

© 2012 African Federation for Emergency Medicine. Production and hosting by Elsevier B.V. All rights reserved.


© 2012 African Federation for Emergency Medicine. Production and hosting by Elsevier B.V. All rights reserved.

African Relevance

- There is a need for emergency medicine (EM) systems development across Africa to address acute and chronic diseases, non-communicable diseases and trauma in Ethiopia.
- It is necessary to determine key strategies that help guide EM maturation that are practical, take existing health care systems into account with continuous effort and advocacy to initiate, develop and sustain contemporary emergency medical services.
- Stakeholders must work together to ensure local applicability and long-term sustainability to build on current efforts to provide EM education, training and clinical care in Ethiopia.

What’s new?

- Short and long-term goals must integrate an approach that feeds into the development of a mature EMS programme.
- Addis Ababa’s increasingly fragmented pre-hospital care system should be integrated, standardized and coordinated.
- Pre-hospital care services and emergency centre personnel should be appropriately educated and adequately trained or retrained on EM.
- Funding for short and long-term EM programmes should be secured – a challenge in resource limited countries like Ethiopia because of competing priorities or economic difficulties.

Introduction

Ethiopia’s health care needs are immense and complicated. This ancient country in the Horn of Africa is home to over 80 million people (in nine regional states), most of whom are unfortunate and live in rural settings. The population is growing rapidly and expected to exceed 100 million by 2020. Despite the progress that has been made to improve access to basic health care for the population (90 per cent of the population has access to the primary health care service), the infant, child and maternal mortality rates remain high. The infant mortality rate is 69 per 1000 live births, the child mortality rate is 104 per 1000 live births, the maternal mortality rate is 470 per 100,000 live births, and life expectancy at birth is only 53.4 years for male and 55.4 years for female. The country has one hospital bed per 6150 people (rank 17 among nations), one physician for 56,000 and one nurse for 3000 people. The communicable diseases most associated with poverty have been compounded by diseases of urbanization and economic development, such as cardiovascular diseases and vehicular trauma.

Addis Ababa (AA), the capital of Ethiopia and one of the nine regional states, has an estimated population of 3.5 million and boasts the highest concentration of industry, commerce and social services in Ethiopia. It has the highest concentration of healthcare facilities and trained healthcare practitioners in the country. The city is almost at the geographic centre of the nation, covering an area of 530.14 square kilometres. An estimated 60% of the car crashes are in AA and pedestrians are the highest proportion (81.5%) of people involved in traffic accidents. High population density, urbanization and limited emergency medical service (EMS) infrastructure imposes enormous burden on healthcare delivery systems in AA. Understanding of the AA situation and evaluating what has happened in AA will provide lessons (i.e. for scale up) to develop integrated emergency medical service systems for the city as well as for the nation.

Current state of emergency medicine in Addis Ababa, Ethiopia

While advanced EMS systems in high-resource settings have been shown to save lives that previously had a high risk of
dying at the scene or en route to the hospital,\textsuperscript{10} there is still a high burden of preventable morbidity and mortality in resource-limited metropolitan cities such as Addis Ababa, Ethiopia, that lacks a responsive and time-sensitive EMS system.\textsuperscript{11} The high burden of non-communicable diseases and injury because of urbanization and way-of-life changes of the AA residents is exacerbated by multiple factors, including the lack of a coordinated EMS system, the lack of designated well-developed emergency centre (EC), the lack of human and material resources to care for injury or acutely ill patients, the lack of medical training on principles of triage and emergency management, and the lack of sustainable funding for emergency services.

**Overall coordination and delivery of services**

Public health care in AA is provided mainly through the Federal Ministry of Health (FMOH) and the Addis Ababa Health Bureau (AAHB).\textsuperscript{12} In addition, AA has 28 private hospitals, with a capacity of 925 beds, which offer services on a fixed-fee basis.\textsuperscript{13,14}

Almost all hospitals in AA have an “emergency-unit or receiving area” in Outpatient departments (OPD) where both scheduled and emergency patients are seen. Addis Ababa has no organized EMS system for pre-hospital care. Critically injured or ill patients arrive at poorly equipped and disorganized OPD emergency-units through the Addis Ababa Red Cross (AARC) ambulances or an informal network of private ambulances, cars or taxis.\textsuperscript{15} There is no air ambulance service, and ambulance staff and receiving hospitals do not communicate with one another. In addition, no single citywide dispatch number exists. Each agency involved in emergency response has its own emergency number composed of three to six digits. The AARC has 10 ambulances and provides services via a 9-9-2 number; however, the agency can only run four ambulances per day because of the limited municipal budget. AARC ambulances have a stretcher and basic supplies (such as wound care materials), but do not have advanced life support equipment (such as airway devices, defibrillators, suction machine etc.). The AARC ambulance is staffed by volunteers trained for 72 h on first aid.\textsuperscript{16} The private hospitals’ ambulances provide services for inter-hospital transfer and for transport to the hospital that operates on a strictly fee-for-service basis.

In almost all public and private clinics and hospitals in AA, Ethiopia, facilities and equipment for administering emergency care are inadequate. Even hospitals that have dedicated space and staff for receiving acute care patients lack basic equipment and medications.\textsuperscript{17} Government-run hospitals in AA do not have designated ECs, with the exception of the recently constructed EC in two referral and teaching hospitals.\textsuperscript{18,19} Hospital emergency care in private hospitals is often not even initiated without a down payment, so investigative and therapeutic procedures are often withheld until payment is received. Patients who lack sufficient funds are directed to seek care at government hospitals. Many for-profit (and even not-for-profit) private hospitals feel they lack both the personnel and resources to provide open-door emergency treatment.

**Triage**

No national or regional guidelines exist for triage, patient delivery decisions or pre-hospital treatment plans.\textsuperscript{20} “Triage” may be provided by a general practitioner and a health assistant or nurse on duty, but is rarely practiced by people who can recognize the early signs of life- or limb-threatening illness.\textsuperscript{21} Therefore, those who could benefit most from early intervention are often forced to wait, while those who do not require immediate care might be seen first. The lack of a proper triage system and the lack of a designated EC make it difficult to provide dedicated emergency care with appropriate triage protocols, rapid diagnosis and timely treatment.\textsuperscript{22} In most hospitals in AA, each major department (e.g., surgical, medical, Pediatric and Obstetrics and Gynecology) provides OPD emergency-unit or receiving area coverage and manages the intake of acutely ill patients. The emergency units of even the best-equipped and best-staffed public hospitals lack the human and material resources to care for a person in distress: efforts to support airway function, provide sedative and pain medications, or rapidly diagnose patients are often impeded. Most hospital’s emergency-units cannot provide fundamental cardiac care because they lack the required equipment and drugs, such as electrocardiography machines, cardiac monitors or thrombolytic drugs.\textsuperscript{23,24}

**Training**

Ethiopia has no standardized training or certification of emergency medical technicians. The Red Cross provides training for volunteers for 72 h on first aid.\textsuperscript{16} Undergraduate training for physicians, nurses and other health care providers lacks emergency medicine (EM) content. Physician training programmes or curricula focus on making the right diagnosis rather than on the principles of triage and emergency management. This does not prepare Ethiopia’s doctors to effectively triage and manage acutely ill patients.

**Improving the system: What has been achieved so far**

Until the early 1990s, Ethiopia had no systematic programme to improve the knowledge and practice of health professionals working in OPD emergency units. In 1993, initiatives to introduce the concept of contemporary EM were started,\textsuperscript{25,26} largely due to the coordinated efforts of local and international EM advocates.

The country’s medical community embraced the EM concept and built on the foundation started in 1993.\textsuperscript{18,19} In 1996, the first shock/resuscitation room with two beds and basic life-support equipment, was established in the Black Lion Hospital (main training centre of Addis Ababa University

<table>
<thead>
<tr>
<th>Year</th>
<th>Days of Training</th>
<th>No. of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>1999</td>
<td>5</td>
<td>85</td>
</tr>
<tr>
<td>2002</td>
<td>2</td>
<td>40</td>
</tr>
<tr>
<td>2003</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>2004</td>
<td>10</td>
<td>520</td>
</tr>
<tr>
<td>2006</td>
<td>7</td>
<td>70</td>
</tr>
<tr>
<td>2007</td>
<td>7</td>
<td>80</td>
</tr>
</tbody>
</table>

Table 1 Addis Ababa emergency medicine training workshops.
South Africa and Ethiopia.31,32

hosted physicians from Canada, the United States, Uganda, international EM symposium organized by the EMA that then large annual symposia have taken place, including an tion with the Ethiopian Medical Association (EMA). Since launched continuing medical education sessions in collabora-

Medical Facility or AAUMF) outpatient surgical department. In 1998, the AAHB (Regional state office), in cooperation with interested local staff and Israel’s EM association, held the first EM workshop in AA for 20 doctors and 10 nurses (see Table 1), selected from Addis Ababa’s hospital OPD (including university, army and police hospitals).13 Since then, several workshops have been held aimed at improving initial triage and treatment (Table 2).26–28

In 2001, the AAHB, in collaboration with the World Health Organization (WHO), partnered with the people involved in the EM initiatives and instituted a trauma-registry system in the OPD emergency-unit of six hospitals in Addis Ababa, documenting close to 10,000 injury-related emergency visits in one year. Given that injuries account for a quarter of outpatient emergency visits, the pilot data collection demonstrated the feasibility of establishing such a system in hospitals.29

For several years the Ethiopia North American Health Professional Association (ENAHPA) engaged in stakeholder dialogue to help develop EM infrastructure.30 In 2006, ENAHPA and the AAHB organized and hosted an international stakeholders’ meeting in AA, with the goal of improving emergency medicine. Representatives from a cross-section of Ethiopian society, from local women’s groups to the World Health Organization to the Clinton Foundation, attended the meeting.

Also in 2006, Canadian and American university faculties of emergency medicine, together with volunteer academic staff, launched continuing medical education sessions in collaboration with the Ethiopian Medical Association (EMA). Since then large annual symposia have taken place, including an international EM symposium organized by the EMA that hosted physicians from Canada, the United States, Uganda, South Africa and Ethiopia.31,32

In the last 10 years, more than 1000 Ethiopian physicians and nurses have attended EM symposia (sponsored by AAHB, WHO, ENAPA, Israel and USA) focused on leadership, pre-hospital care, basic and advanced life support, and the evaluation and treatment of minor and major trauma. All these events provided opportunities for attendees to increase their awareness of Ethiopia’s need for emergency medicine and integrated medical response. In addition to these national-level symposia, multiple continuing medical education initiatives have focused on transfer of appropriate technologies and advances in science and medicine.

In 2007, the FMOH of Ethiopia invited local and international communities to organize an emergency response system for Ethiopian Millennium celebration (September 2007 – the Ethiopic calendar (similar to Coptic calendar) is seven to eight years behind the Gregorian calendar). The FMOH has continued its effort to enhance EM initiatives in AA and played a critical role in establishing an emergency medicine training programme in AAUMF.

In 2008, the University of Wisconsin, United States, and the University of Toronto, Canada, joined the AAUMF to support Ethiopia’s first Emergency Medicine post-graduate training programme in EM for physicians and nurses.18,33 Currently 13 physicians are attending the EM residency programme in AAUMF.34 Recently, the AAUMF launched a master’s programme in EM and currently there are 20 nurses attending this programme. In addition, under the AAUMF leadership, the Ethiopian Society of Emergency Medical Professionals (ESEMP) was established in 2012. [P2P forum email communication. Posted on December7, 2011].

Ethiopian physicians and other health care providers, phys-
icians and hospitals from around the world have donated teaching materials and medical equipment for other specialized training programmes. One result of these generous donations has been the establishment of an emergency ultrasound training programme at St. Paul’s Hospital in AA. In this case, engineers from Canada traveled to Ethiopia to install the equipment, troubleshoot and provide staff training.30

All these efforts have provided additional key building blocks to establish an EM infrastructure in Ethiopia. Awareness has increased among public servants in the FMOH, leaders in medical education, and safety agencies such as fire departments, the AARC and others, about the need for an Ethiopian EM infrastructure. A team of consultants has been engaged in developing the national injury and disability plan and a strategy for the FMOH, and a working document was submitted to the ministry for approval [personal communication]. Some hospitals in AA have been physically modified to accommodate an emergency unit for critically ill or injured patients. In addition, several of these accomplishments have been published, so that EM professionals in other countries can benefit from the lessons provided by the Ethiopian experience.11,20

The advocacy work and training workshops in EM provided to healthcare workers, members of the business community and various governmental and NGO groups in AA have played a critical role in promoting the EM issue among different groups that are important to the delivery of emergency healthcare in Ethiopia. For example, some workshop attendees have become hospital directors or hold critical positions in health departments, where they can facilitate the understanding of the role of EM in reducing morbidity and mortality, and in minimizing healthcare costs.

Other on-going efforts include programmes led by the FMOH to develop a national EMS system.35 Development of a paramedic training programme is also underway by FMOH focusing on specific training and protocols, equipment, supplies and first-responder skills. To improve the ambulance services in AA and other regional states of Ethiopia, currently the FMOH completed the purchase of more than

<table>
<thead>
<tr>
<th>Table 2 Emergency medicine workshop topics.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction to emergency medicine</td>
</tr>
<tr>
<td>2. Emergency Medical Service (EMS) system: planning, design, documentation, research</td>
</tr>
<tr>
<td>3. Introduction to disaster medicine and management of mass casualty</td>
</tr>
<tr>
<td>4. Basic and advanced airway management</td>
</tr>
<tr>
<td>5. Medical emergencies (cardiovascular, respiratory and metabolic disorder)</td>
</tr>
<tr>
<td>6. Pediatric emergencies and resuscitation</td>
</tr>
<tr>
<td>7. Basic trauma care (principle of triage, head injury, chest and abdominal trauma)</td>
</tr>
<tr>
<td>8. Obstetric/gynecologic emergencies</td>
</tr>
<tr>
<td>9. Imaging in the emergency centre, including ultrasound</td>
</tr>
<tr>
<td>10. Others (partnership, sustainability and ethics in emergency medicine)</td>
</tr>
</tbody>
</table>
800 ambulances and distributed half of these ambulances (one ambulance per district) for all regional states health bureaus.  

Discussion

Significant progress has been made in Ethiopia to develop EM; the efforts however have been largely limited to AA and have not been coordinated by an umbrella organization and have not been tied into the overall Ministry of Health plans for the healthcare workforce and delivery goals set by the FMOH. 37 We feel that the lack of stakeholder coordination in setting short and long-term goals, and sharing resources and information will lead to a fragmented system and will frustrate the good efforts of all involved parties. To accomplish the goal of locally relevant and sustainable EM development, efforts should be conducted with close coordination or under the FMOH leadership. In addition, general agreement must be reached among relevant institutions as to the definition and scope of EM for AA, and ultimately for the nation. There is an urgent need to determine key strategies that help guide EM maturation. 38 These strategies must be practical, take into account existing health care systems with continuous efforts and advocacy works to initiate, develop and sustain contemporary emergency medical service in AA, Ethiopia. The AA model, while based on the same EM principles used around the world, will have to be customized to the local culture, geography and resources. No other national model can simply be “dropped into place” and expected to provide good results if they do not have local applicability and stakeholder buy-in.

A number of other initiatives must be launched or maintained for EM in AA, Ethiopia to continue its upward course. These should include the following three recommendations:

First, AA’s fragmented pre-hospital care system should be integrated

Addis Ababa’s increasingly fragmented pre-hospital care system is in dire need of standardization and coordination. The current situation, where patients are brought by private cars and taxis or by public transport (AARC or police ambulances), without any information and without coordination among the various agencies, should be changed. Under the leadership of FMOH, all key players in pre-hospital response, especially the Red Cross, the fire and emergency departments, police and hospital-based ambulance services should discuss and integrate their response efforts and establish a coordinating body to lead the EM development in AA. This must include designation of pre-hospital care director to monitor routine activities. The coordinating body must assess the needs and capacity of all partners, propose an allocation of funds, define policy on resource development and must outline the integration mechanism. 39

Second, pre-hospital care services and EC personnel should be trained or re-trained on EM

Appropriately educated and adequately trained personnel are an essential component of any healthcare system. For this to occur there must be coordination at the federal government level to ensure that educational standards and scope of practice of pre-hospital care and EC practitioners are at an acceptable and locally applicable level. Excellent strides have been made in establishing the first EM postgraduate training programme at the AAUMF. This “test tube” programme should be providing the core faculty for expanding EM training programmes beyond the AAUMF to other regional states’ universities such as Jimma, Awassa, Gonder and Mekelle Universities. For shorter training sessions, Addis Ababa’s experience suggests that informal and formal training or sensitization workshops targeting health professionals, hospital administrative staff, first responders and policy makers play a key role in understanding or getting support from potential partners and decision makers to develop EM. This should include training for both physicians and non-physicians, and will require coordination among the federal and regional health bureaus, educational institutions and NGO’s. In each region, people interested in EM and committed policy makers should be identified for advocacy work and to promote EM in their region. Conducting regional workshops to create awareness might be the best kick-off strategy. Prior to the implementation of full EM programmes in regional states, interested individuals, groups or institutes should be identified and initiative or working groups at regional levels should be established. The working groups should have short and long-term goals and a clear plan on how to integrate and standardize the fragmented emergency response system and address the issues of leadership, training, funding, infrastructure development, and sustainability of EM programmes. The FMOH, Federal Ministry of Education and the Ethiopian Emergency Medical Association have normative and guidance roles to play in coordinating and standardizing the EM training programme and integrating the fragmented emergency response system in AA, as well as in other regional states of Ethiopia.

Third, funding for short and long-term EM programmes should be secured

Securing the funding for EM programmes might be a challenge in resource limited countries like Ethiopia because of competing priorities or economic difficulties. Regardless of the situation, the FMOH and the “coordinating body” should explore the availability of funds locally and overseas. Perhaps in AA, approaching local sources, such as the national disaster preparedness fund, the national road safety fund and the emergency fund administration office of the regulatory office for the country’s mandatory car insurance might help fund projects for training or for building local capacities for emergency and disaster response. Cooperating with foreign associations such as the African Federation of Emergency Medicine and the International Federation for Emergency Medicine, and with other institutes, such as universities and the diaspora community, may secure additional funds until the system can be fully funded by taxpayers or become self-sufficient.

Conclusion

Despite progress in developing some of the necessary components, AA is still a long way from having an integrated EMS system. The federal and regional health bureau and emergency response agencies in AA should work together to integrate the fragmented responses and establish a well-developed integrated response system with a single citywide dispatch centre
to respond for the desperate calls of the community during an emergency. This requires a coordinating body for pre-hospital care with clear short and long-term goals in addressing Addis Ababa’s current challenges, such as lack of human and material resource to care for injured and acutely ill patients both in the pre-hospital and EC setting.

Long term sustainability of the integrated response system and emergency medicine training will depend on funding and collaboration from all stakeholders, including governments, non-governmental organizations, teaching institutions, donors and private organizations. We encourage all stakeholders to work together to ensure local applicability and long term sustainability to build on the current efforts to provide Emergency Medicine education, training and clinical care in AA, Ethiopia and expand the AA initiative to other regional states of Ethiopia.

Appendix A. Short answer questions

Test your understanding of the contents of this case report (answers can be found at the end of the regular features section).

1. Which key factors currently contribute to the high morbidity and mortality related to medical emergency injuries in Ethiopia?
   a. Lack of a coordinated EMS system with a universal contact number.
   b. Lack of a designated well-developed emergency centre.
   c. Lack of human and material resources to care for injured or acutely ill patients.
   d. Lack of medical training on principles of triage and emergency management.
   e. Lack of sustainable funding for emergency services.

2. What are the obstacles to formation of a mature emergency system in Ethiopia?
   a. Scale of jurisdiction/population.
   b. Financial.
   c. Administrative.
   d. Educational.
   e. Political.

3. What are the key building blocks to establish an EM infrastructure in Ethiopia?
   a. Leadership.
   b. Education/awareness.
   c. Funding.
   d. Infrastructure development.
   e. Sustainability.

References

22. Levine AC, Presser DZ, Rosborough S, Ghebreysus TA, Davis MA. Understanding barriers to emergency care in low-income


