

**SITUATION ANALYSIS OF THE PROVISION OF
PREHOSPITAL EMERGENCY MEDICAL SERVICES IN
THE NAIROBI COUNTY, KENYA**

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Situation analysis of the provision of prehospital emergency medical services in the Nairobi County, Kenya.

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DECLARATION

I declare that this thesis is my original work and has not been presented for a degree in any other university.

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ABBREVIATIONS AND ACRONYMS

ALS	Advanced life Support
ACSCCT	American College of Surgeons Committee on Trauma
BLS	Basic life Support
CPR	Cardio Pulmonary Resuscitation
CPASK	Concept Paper of the proposed Ambulance Services in Kenya
EKG	Electrocardiogram
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
EMT-1	Emergency medical technician level 1
EMT-B	Emergency Medical Technician Basic level
FGD	Focus Group Discussion
ICS	Incident Command System
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KCEMT	Kenya Council of Emergency Medical Technicians
KEMRI	Kenya Medical Research Institute
KEPH	Kenya Essential Package for Health

KHPF	Kenya Health Policy Framework
MoMs	Ministry of Medical Services
NDMP	National Disaster management Policy
NDRP	National Disaster Response Plan
NHSSP II	the Second National Health Sector Strategic Plan
NHTSA	National Highway and Traffic Safety Administration
USAID	United States Agency for International Development
USA	United States of America
WHO	World Health Organisation

DEFINITION OF OPERATIONAL TERMS

Ambulance	A vehicle equipped for transporting patients in need of emergency care
Advanced Life Support	A level of care provided by prehospital emergency medical services. Advanced life support consists of invasive life-saving procedures including the placement of advanced airway adjuncts, intravenous infusions, manual defibrillation, and electrocardiogram interpretation
Basic Life Support	Non-invasive life-saving procedures including CPR, bleeding control, splinting broken bones, artificial ventilation, and basic airway management. Basic life support level certifications include emergency medical technician (EMT)
Calls	Responding to an emergency by EMS personnel
Cannulation	The introduction of fluids into the body via the blood vessels or bone marrow
Dispatch	When the dispatcher directs the EMS personnel to a specific location of an emergency
Emergency Medical	A certified healthcare provider who is

Technician	trained to treat and transport victims of emergencies
Emergency Medical Services	Services specifically designed, staffed, and equipped for the emergency care of patients
EMS Agency	A business or organization established to provide emergency medical service
EMS Facilities	Encompasses the EMS agencies, hospitals, fire stations
EMT-Basic	Emergency medical technician-basic: an entry-level emergency medical technician who is trained in basic emergency care skills, can also be referred to as an Emergency Medical Technician
Equipment	Expendable and nonexpendable supplies, apparatus, and instruments that are used in diagnostic, surgical and therapeutic procedures
First responder	A layperson in the community trained to identify a medical emergency, intervene with BLS skills and request for medical backup where necessary
Golden hour	a time period between first contact of EMS providers and patients to presenting the patient to definitive care in hospital this should ideally be one hour; during which there is the highest likelihood that prompt medical treatment will prevent

	death
Good Samaritan call Incident	Ambulance services provided at no cost An expected negative occurrence of a large enough magnitude to warrant the involvement of several sectors
In-hospital	Within the hospital setting
Load and go	A colloquial phrase in EMS, referring to critical patients who cannot receive medical care on site due to imminent threat to life or limb hence they are immediately evacuated; emergency medical care is provided en-route to hospital
Medical Control .	Certified and licensed medical doctor who provides medical directives for specific medical conditions, these directives can be offline in the form of formal standing orders
Paramedic	A certified healthcare provider who is trained to treat and transport victims of emergencies. Paramedics provide ALS to victims, and have a wider scope of practise than emergency medical technicians
Prehospital emergency medical services	Has the same meaning as ‘Emergency Medical Services’
Emergency Medical Services	Care of patients with critical and life threatening medical conditions provided

	by specially trained and authorized personnel; outside and en-route to hospital
Refresher course	Short term course aimed at recall and reinforcement of previously acquired knowledge and skills
Resource	Available manpower, facilities, revenue, equipment, and supplies to produce requisite health care and services
Scope of practise	Skills that licensed healthcare providers is trained to do
Shift	A type of <i>work</i> schedule in which groups of workers rotate through set periods throughout the day; typically performing the same kind of <i>work</i>
Sit and play	A colloquial phrase in EMS, referring to patients whose initial condition allows the EMS providers to provide medical care on scene before transportation
Stand –by	A team of emergency medical technicians ready and awaiting deployment
‘Manned an ambulance’	Equip an ambulance with personnel
White paper	A government or other authoritative report giving information or proposals on an issue

ABSTRACT

Emergency Medical Services or EMS is the patient care provided on-scene and en-route to hospital. It serves as the first point of contact for majority of people to healthcare services during emergencies and life threatening injuries; these services serve the purpose of reducing preventable morbidity and chances of mortality. Developing countries such as most of the African states lack these services, except for the few such as Kenya; where these relatively new services are provided by locally trained EMS personnel mainly working in privately run ambulance agencies. There is insufficient documented information on prehospital EMS in Kenya. The objective of this study was to explore factors influencing provision of emergency medical services in the urban setting of Nairobi County. A cross-sectional mixed methods study design was selected. The participants were; emergency medical technicians (EMTs) and EMS ambulance agency managers, all were purposively selected. After verbal consent the data was generated by use of questionnaires, focus group discussions and in-depth-interviews. Forty four self administered questionnaires were completed by the EMTs. One focus group discussion per gender was conducted with the EMTs. Nine in-depth interviews were conducted with EMS ambulance agency managers. The quantitative data was analysed using descriptive statistics. The qualitative data was transcribed, coded, and analyzed using constant comparison. Four factors were identified as influencing provision of pre-hospital emergency medical services in the urban setting; subjective EMS standards, availability and distribution of EMS resources, EMS awareness and existing road infrastructure. The common factor or core category that linked to the other four was; ‘the role of the government in prehospital EMS implementation.’ 95.5% (42) of the EMTs emphasized that to provide proper healthcare there was a need to enforce standards on the qualifications of an EMT, only 25% (11) EMTs had valid practising licenses and only 50% (22) had attended an additional medical course. According to 72.2% (32) of the EMTs, adequate numbers of appropriate equipment was a constituent of quality service. 61.4% (27) of the EMTs agreed that for provision of quality service there was need for adequate numbers of personnel per shift. 75% (33) EMTs stated that EMS awareness among the public led to proper utilisation of their services and cooperation thus increasing the chances of the casualty having a better outcome. It was argued by 90.9% (40) EMTs that a good working environment provided for by an agency administration that was conversant with all the aspects of prehospital EMS would enhance their potential. Findings of this study led to the following conclusion; the establishment and development of EMS in Nairobi is determined by the extent of involvement and engagement of the national government. The recommendation is that the relevant organs within the county government should play an active and the main role in the establishment and development of EMS, this will enhance service provision.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Emergency Medical Services (EMS) is the mechanism through which emergency medical care is provided on-scene and en-route to a medical facility. Transportation is by road or air ambulance (Hendrickson, 2000). EMS serves as the first point of contact for a majority of people to healthcare services during emergencies and life threatening injuries (Jamison *et al.*, 2006; Al-Shaqsi, 2010). Emergency Medical Services entails synchronizing and coordinating an EMS system of trained personnel referred to as emergency medical technicians (EMTs), medical facilities, and equipment; such as ambulances. This is to ensure a continuity of care for the patient in a seamless and timely manner. EMS serves the purpose of reducing preventable morbidity and chances of mortality (Liebermann *et al.*, 2000).

Arnold (1999) placed the development of EMS into three categories; mature, developing and underdeveloped. With the exception of South Africa most of Africa and other resource constrained third world states have underdeveloped and insufficient EMS (Peden *et al.*, 2004; Sasser *et al.*, 2005). Kenya is amongst the few African states with some form of organised EMS, provided by ambulance agencies albeit urban, privately owned and operated; with the highest concentration being in Nairobi County. The personnel who provide this EMS are of undetermined training; though all are generally referred to as EMTs.

EMS in Kenya is not formally recognised by the government as a valid source of healthcare (Wachira & Martin, 2011). This is despite the fact that access to emergency care is the constitutionally protected right of all citizens (The Constitution of Kenya, 2010). However, hospital-based ambulance services run by the country's ministry of health are well recognized and implemented by the government for patient referral purposes (NHSSP II, 2008). Whereas an EMS system is intended to widen access to and responsiveness of the health care services (Mock *et al.*, 2003), planned patient transport and inter-health facility referral does not suffice. The two do not offer public protection, early detection or on-scene acute care; they only continue medical care or transportation for those already enrolled in the health system.

The private ambulance agencies in Kenya and their EMT personnel are not integrated within the national healthcare system of the Ministry of Health (Wachira and Martin, 2011). This is despite the fact that EMTs have already been assigned roles; of rescuers and humanitarian responders as detailed in both the draft National Disaster Management Policy (NDMP) and the draft National Disaster Response Plan (NDMP, 2009; NDRP, 2009), should any disaster occur within the country. Instead, the ambulance agencies operate independently from any medical regulatory body that would determine and enforce requirements for quality service delivery. In contrast, the World Health Organisation accepts EMS as an integral part of a national healthcare system (Al-Shaqsi, 2010).

The private ambulance agencies in Kenya are guided by individual company policies and they apply coordination and cooperation during multi-agency incident responses on a very informal basis (Wachira & Smith, 2013). By virtue that the agencies have been enabled by the right to free economic enterprise; they continue to offer services to the public whilst these services are yet to be fully understood, described, effectively utilised or regularised.

1.2 Statement of the Problem

Emergency Medical Services are a devolved function of the forty seven counties of Kenya as per the new country's constitution (The Constitution of Kenya, 2010). In Nairobi County these services are expected to serve an estimate population of 3,138,369 inhabitants living within 696 square kilometres (Census Kenya, 2009); this is ideally whereby both the hospital-based and the existing EMS ambulance agencies are co-jointly providing these services as a complete EMS system.

The number of personnel formally trained on EMS is smaller in comparison to other forms of healthcare providers. The prevailing inadequacy in the provision of EMS in Nairobi County and the inadequacy in the provision of the same by properly trained personnel can cause exacerbation of injury and preventable death. High quality EMS that entails effectively provided services have been proved to serve the purpose of reducing preventable morbidity and chances of mortality (Liebermann *et al.*, 2000).

In Kenya, EMS ambulance agencies are yet to be formally recognised and integrated as essential healthcare service providers, thus EMS has not been well understood due to there being limited information on the same. Ambulance agencies in Kenya and Nairobi County continue providing services, despite there being insufficient research conducted to evaluate and assesses the quality of services provided. There is need to develop parameters and appropriate indicators of measuring the quality of services rendered and the resource capacity; of EMS ambulance agencies in Nairobi County to meet its populations' medical needs. These indicators would be at par with available resources and present capacity.

1.3 Justification

Government ambulance services in Kenya were created for two main purposes; hospital patient referrals and accompaniment for county fire services. Ambulance agencies

separate from the government then begun to be formed for the purpose of making EMS more accessible to the population. There is little documented research on the existing EMS being provided by these ambulance agencies.

This study highlights some of the factors influencing provision of EMS in Nairobi County from the viewpoint of the service providers. These factors shall serve as some of the indicators for measuring the quality of services rendered and consequently leading to the creation of inferences and directives on improvement of service delivery.

Nairobi County has been selected as the study area due to the fact that it where the initial formal training and certification of Emergency Medical Technicians in Kenya was conducted, through the coordination of United States Agency for International Development (USAID) in 1998, hence EMS has been established longer there than in other counties. Nairobi County is also where most of the ambulance agencies are located in comparison with other counties. Some of its ambulance agencies have branches located within other counties.

1.4 Research Questions

1. What are the capacity indicators of EMTs in Kenya.
2. What are the perceptions of EMS personnel on these services.
3. What are the resources both human and equipment, on-board the ambulances?

1.5 Objectives

1.5.1 General Objective

To explore factors influencing provision of emergency medical services in Nairobi County

1.5.2 Specific Objectives

1. To explore specific capacity indicators of EMTs in Nairobi to provide emergency medical services.
2. To explore the perceptions of EMS personnel (EMTs and ambulance agency managers), towards provision of emergency medical services.
3. To describe the resource capacity on-board the ambulances that deliver emergency medical services in Nairobi County.

1.6 Scope

Nairobi County was the selected geographical area for this study. Ambulance services in this county are better established and some ambulance agencies having branches located within other counties.

1.7 Limitations of the Study

The EMS in Kenya is male dominated. The nine agencies in the study except one; had male managers and a majority of the agencies had an all male crew. Also due to this, only a single females' only FGD could be convened.

Another limitation was that, a study based on human resource denotes that at the time of the study there were either more hired or less retained EMTs, by the different ambulance agencies.

At the time of the study fifty-five EMTs had been hired by the ambulance agencies existing in Nairobi; this explains the small population size in this study, thus all were selected via universal sampling.

The study was also limited in the size of study area due to financial and time constraints; hence only Nairobi County was selected.

CHAPTER TWO

LITERATURE REVIEW

2.1 History of Emergency Medical Services (EMS)

The first documented form of EMS was of horse drawn structures referred to as ‘flying ambulances’ which were used to evacuate injured soldiers from the battlefield in the 1800’s (Brewer, 1986). In 1966 a ‘White paper’ report was created with an aim of advising EMS ambulance providers globally on the importance of initiating intentional and purposeful changes in policy making, funding, educational curriculum, regulation, organization, and standardization of EMS services. These changes were to facilitate better patient outcomes (Bledsoe & Cherry, 2000). Other countries adopted and customised these directives to create their own EMS. The customised EMS provide the six stages of high quality pre-hospital patient care, which are: Early Access of ill or injured person, Early Activation of the EMS, Early response, Good on-scene care, Care in transit and Prompt Evacuation to definitive care. The first two stages are conducted by the layperson whilst the last four by the EMS providers (Zatz, 1992).

2.2 Emergency Medical Services in Kenya

The existing EMS in Kenya remains unrecognised by the government and functions independent of the national healthcare system (Wachira & Martin, 2011). As a solution to this, the Kenya Council of Emergency Medical Technicians (KCEMT) has been cooperating with the Nursing Department of the Kenyan MoMs to have the Kenyan government recognise EMS; as a necessary service to be integrated with other health care services, which the government provides. The benefits of integrating EMS will be; support, strengthening of its infrastructure, more appropriate use of acute health care resources and broadening involvement in enhancing the health of the community (EMS NHTSA, 1996; CPASK, 2012).

To provide some level of guidance, KCEMT has also created a draft of the Kenya Ambulance Act concept paper (KCEMT, 2009) that aims to regulate ambulance services in the private and public sectors. The concept paper details out the standards to be adhered to by ambulance service providers. These standards include and are not limited to; the required training and qualifications of hired personnel based on the EMT level 1 (EMT-1) curriculum, specifications of any vehicle designated as an ambulance, the minimum type of onboard medical equipment and the requisite services of medical control. It also recommends the appropriate ratio of trained EMTs to type of EMS provided whether Basic Life Support (BLS) or Advanced Life Support (ALS). This concept paper awaits submission to, and subsequent approval by, parliament as a bona fide policy. Thus compounding the situation of unregulated provision of EMS and non-assurance of uniform quality provision amongst providers; even further.

2.3 Ambulances Service Providers

Ambulances services provided by agencies worldwide; are generally managed and coordinated either by the government, humanitarian organisations or private companies (Huemer *et al.*, 1994; NHTSA, 2004). Kenya has the three forms of ambulance service providers.

2.3.1 Government Ambulance Services

The local, provincial or national government fund these ambulance services (NHTSA, 2004). These services are inculcated as part of the national health system and provide EMS as a right to its citizens. In Kenya, government ambulance services are provided in two ways, one of which is thorough the Kenya Essential Package for Health (KEPH) a hospital referral system that ascends from the community level hospital to the tertiary level hospitals (NHSSP II, 2008). The second form of ambulance services offered by the Kenyan government is through local council fire stations that have the mandatory ambulance services to accompany the fire engine during a fire outbreak. Some of these

fire stations such as the Nairobi city council offer ambulance services to the public upon request and at a fee.

2.3.2 Organisation-based Ambulance Services

In Kenya the Kenya Red Cross Society and the St. John Ambulance organisations provide and operate full-time ambulance agencies for emergency medical services. Their staff members include both hired personnel and volunteers.

2.3.3 Private Ambulance Services

These are commercial companies with paid employees, who provide; ambulance transport for patients in non-critical conditions, on scene and en-route emergency care and 'Stand-by' cover at industrial sites or at special events. Patients and clients are billed for services directly, and many ambulance agencies have a strong payer base due to their size and operational response area (VanRooyen *et al.*, 1999). A majority of EMS ambulance agencies in Nairobi are privately owned companies that create their own policies on standards of practise. Private companies offering fire-rescue services in Nairobi also have the mandatory complementary ambulances for management of a fire incident. Both the fire- rescue and ambulance services are offered at a fee.

2.4 Training of Emergency Medical Services (EMS) personnel

Defined scopes of practise in EMS result in ascending levels of personnel with increasing knowledge and skill (NHTSA, 2004). These scopes also result in the classification of EMS into either basic life support (BLS) or advanced life support (ALS) ambulances. Internationally, BLS forms the basis of the training of EMS personnel. BLS once initiated on trauma patients served the purpose of reducing morbidity and chances of mortality (Liebermann *et al.*, 2000). BLS can further be enhanced by advanced training on ALS skills, which are more expensive to practise in terms of

equipment and skill required (Sayre *et al.*, 2011). Studies have shown that costly ALS interventions though advanced are not superior to the less expensive yet effective BLS interventions (Sasser *et al.*, 2005).

Emergency Medical Services education is divided into defined scopes of practise per individual level of EMS providers. The US national highway traffic safety administration (NHTSA) has organised the training into sections: didactic, or classroom lecture time, clinical time usually in a hospital settings, and field time on an ambulance. Each section has a specific number of total hours that a student is expected to meet so as to qualify for the various EMT levels (NHTSA, 2005). In addition to initial training, continuing education and continuous quality improvement (Katz & Falk, 2001) must be performed in order to maintain certification, licensure, or registration (Assaad, 2006).

In Kenya, KCEMT created the EMT level one (EMT-1) curriculum in 2006, it is a combination of both BLS and ALS Skills, the curriculum includes didactic, or classroom lecture time, clinical time usually in a hospital settings, and field time on an ambulance as directed by the US National Highway and Traffic Safety Administration (NHTSA, 2005). This step followed the recommendation to developing countries on the necessity of formulating training modules applicable to their conditions and capabilities (Kobusingye *et al.*, 2005; Sasser *et al.*, 2005). Different ambulance agencies in Kenya have begun conducting independent EMT course training. Ideally this is to be done with the guidance and approval of KCEMT on the proper manner and requirements for setting up; an effective training program, this is not usually the case (Personal communication with KCEMT, 2012).

2.4.1 Different EMS personnel

Defined scopes of practise in EMS result in ascending levels of personnel. The ascent begins as a first responder and peaks as a paramedic with progressive increase in; skill, knowledge, qualifications, services provided, risk, amount of autonomy and decision

making capacity. The acquired qualification translates to licensure and with it the roles the EMS personnel can legally undertake. There is also the increasing complexity in acquiring and retaining skill competency (NHTSA, 2004).

2.4.1.1 First Responder

First responders are laypersons in the community trained in BLS. They are trained to identify medical emergencies and intervene with skills that require the use of minimal equipment. They are also trained on the safe handing over of a casualty to more skilled persons such as emergency medical technician (EMT), where necessitated. The training and certification of first responders in Kenya has been the mainstay of organisations such as St. John Ambulance and Red Cross Society of Kenya and many others. This training equips the common citizen on how to save a life using minimum equipment. First responders serve an important role in the community as concluded by a study conducted in Oslo, Norway (Wik *et al.*, 1994), where it was proven that; the chances of a future hospital discharge for a cardiac arrest victim increased when the first responder provided good cardio pulmonary resuscitation (CPR).

2.4.1.2 Emergency Medical Technician basic level (EMT-B)

Emergency medical technicians basic level or EMT-Bs are professionals trained in trauma care and thus have knowledge and skills beyond those expected of bystanders and first responders. They are trained using the EMT-Basic curriculum on extrication and rescue of trapped patients, scene management and a wider range of medical interventions. This training equips them to determine whether a patient requires immediate evacuation colloquially referred to as ‘load and go’ or whether the patient can be stabilized in the field first, before transportation also known as ‘sit and play’. The training also involves determining whether the casualty’s condition exceeds their scope of practise necessitating the summoning of paramedics to continue patient care. Between 1998 and 2000 the USAID had trained one hundred and thirty four EMT-B’s

in Kenya from various backgrounds; ambulance workers, fire fighters, disciplined forces and hospital staff. The EMT-Basic curriculum was used for the trainings (EMT-B standard curriculum, 1990).

2.4.1.3 Emergency Medical Technician level one (EMT-1)

This level is unique to Kenya; the personnel are locally trained to have a professional capacity and scope exceeding that of EMT-Bs as it includes some of the duties performed by a paramedic, such as; cannulation, EKG monitoring. This level and corresponding curriculum was intentionally created by KCEMT due to the increased time the technician spent with the patient en-route to hospital on account of incessant traffic jams and dilapidated roads in Nairobi. This in turn demanded of the EMS personnel to use additional skills to sustain the life of the patient as long as was possible.

Upon successful completion of the course, the EMT-1 is provided with a practising license by KCEMT which is renewable biannually after attending an EMT refresher course. The facilitation of the refresher course begun in 2012 and is conducted solely by the council. By the year 2011 the council had certified and licensed one hundred and eighty four (184) Emergency Medical Technician level ones. In total three hundred and twenty eight (328) Emergency Medical Technicians have been trained in Kenya between the years 1998 and 2011 they are a combination of EMT-B's and EMT-1s.

The KCEMT expects all trained and certified EMT-1s to be psychologically balanced, intelligent with good physical health and high level of fitness, motor coordination, dexterity, good eye to hand coordination and eye-hand-foot coordination. This is because of the physically and psychologically demanding work environment of pre-hospital emergency services provision. These standards expected of a qualified EMT were developed by the Psycho educational Clinic of the Ohio State University, at the request of the Board of Directors of the National Registry of Emergency Medical Technicians and adopted by KCEMT (Anonymous, 2011).

The EMT-1s are also expected to immediately assess and recognise the nature and seriousness of a patient's physiological state upon making contact and consequently administer the appropriate medical care based on the assessment findings of the patient's conditions, after which expedient and safe transportation to hospital is provided. The entire process should ideally occur within one hour, with a maximum ten minutes on scene so as to increase the chances of survival. A study done in England 1997-2001, concluded that for every 10 kilometres away from a hospital the risk of death rose by 1% (Nicholl *et al.*, 2007).

2.4.1.4 Paramedics

Paramedics are trained to provide more extensive and complex prehospital care than either EMT-Bs or EMT-1s. They have a wider scope of practise which includes the provision of advanced life support (ALS) care and use of sophisticated medical equipment. The presence of a qualified paramedic on board an ambulance directly elevates the EMS to ALS irrespective to whether the partner personnel is an EMT. This is in comparison to where an ambulance is fully staffed by EMTs, these EMS are classified as BLS. There is no paramedic training available in Kenya.

2.5 Provision of Emergency Medical Services (EMS) in other countries

Previous studies have shown that provision of EMS is influenced by positive and negative influences also referred to as facilitators and barriers respectively. One study conducted in Iran based on how EMS providers perceived provision of trauma care to road traffic accident victims; summarised facilitators and barriers to service provision as; factors within EMS and factors outside EMS (Haghparast-Bidgoli *et al.*, 2010). The methodology commonly utilised in these studies was of a qualitative design. Data collection was via; focus group discussions, in-depth interviews or both (Grudzen *et al.*, 2009; Haghparast-Bidgoli *et al.*, 2010). Though other studies used a quantitative approach and collected data using a survey (Harris & Nicolai, 2010; Donnelly, 2012).

Study participants of these studies were all directly involved in EMS; they were EMTs, agency managers or administrators. They were purposively selected (Grudzen *et al.*, 2009, Haghparast-Bidgoli *et al.*, 2010).

What segregates these studies from this particular study is that, the EMS in the individual study countries was part of the Ministry of health unlike Kenya's situation where EMS operates independent of the Ministry of health. Previous studies on prehospital EMS are set in countries such as Iran, US, whose EMS system are developing or developed as compared to the underdeveloped EMS system of Kenya.

The inadequate research conducted on EMS in Kenya has resulted in inadequate documentation for reference and subsequent limited knowledge. There are two reports on emergency services in Kenya; using literature reviews on disasters across the country. They broadly highlight the short comings of insufficient training of EMS personnel, lack of resources, uncoordinated incident management and a lack of standard operational procedures. (Wachira & Martin, 2011; Wachira & Smith, 2013). These two reports neither expound on the probable causes of these short- comings nor do they consider the input of the perceptions of the EMS providers. The shortcomings identified in the emergency services can be described as barriers to provision of quality EMS.

The qualitative study design and purposive sampling technique to be utilised in this study will be similar to the previous studies conducted on the influencers to EMS provision. This approach shall guide this study which is the first of its kind to be conducted in Kenya it is also the first study done on EMT-1s. This approach shall also facilitate getting as much information as possible within a short time period, of an area; whose knowledge is limited.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Study area

The study was carried out in Nairobi County the capital city of Kenya, where EMS is frequently utilised and the highest number of ambulance agencies are located. Ambulance services in this county are better established and some ambulance agencies having branches located within other counties.



SOURCE: Map Data@2016 Google

Figure 3.1: Nairobi County

3.2 Study design

A cross-sectional mixed methods study design in specifically the convergent design was selected (Creswell & Plano Clark, 2007, Mingying, 2015). Both quantitative and qualitative approaches were used to make convergent inferences on the same study topic; examined at a point in time (Bowling, 2009). This design encompassed purposive sampling, use of both quantitative and qualitative approaches to gather and analyze data or convergence, concurrent collection and analysis of the data and the merging of the results and inferences on the study topic (Jones *et al.*, 2012). Convergence had the advantage of enhancing the validity of the results by eliminating bias associated with use of only one approach. Another advantage of convergence was the acquisition of more information leading to a better understanding of an area whose knowledge is limited (Caracelli & Greene, 1997; Onwuegbuzie & Leech, 2006).

3.3 Study population

The study population comprised of both certified Emergency Medical Technicians (EMTs) and EMS ambulance agency managers; who provide emergency medical services to the County public.

Inclusion criteria

- Certified emergency medical technicians
- EMT employed at the EMS ambulance agency.
- EMT actively involved in ambulance shifts
- The manager in-charge of operations within the ambulance agency

Exclusion criteria

- Non-certified emergency medical technicians
- EMT not employed at the EMS ambulance agency.

- EMT not actively involved in ambulance shifts
- A manager not in-charge of operations within the ambulance agency

3.4 Sampling Frame

The sampling frame for the ambulance agency managers was; personnel in-charge of ambulance operations at the agencies in Nairobi County.

The sampling frame for the Emergency Medical Technicians (EMTs) was all those who were currently hired in EMS ambulance agencies in Nairobi County (Table 3.1).

Table 3.1: The total number of EMTs currently employed amongst the various EMS ambulance agencies in Nairobi County

EMS ambulance agency	Total number of EMTs
St. John Ambulance	5
Emergency Plus Medical Services	8
African Air Rescue Health Services Ltd	3
Avenue Rescue Services	21
Critical Care Centre	2
West Ambulance	3
Equator Meridian hospital	2
Kenya Airports Authority fire services	1
Nairobi city council fire services	10
TOTAL	55

Source: KCEMT

3.5 Sampling

The sampling units were both the EMTs and the EMS ambulance agency managers. For the quantitative approach all EMTs in the EMS agencies were included, on the basis of available samples, all were included through universal sampling to form a sample size of fifty five (55) EMTs.

For the qualitative approach the key informants were nine (9) EMS ambulance agency managers selected purposively and two Focus Group Discussions (FGDs) which were conducted separately with an all-male and all-female groups of 8 and 4 EMTs respectively. The FGD participants represented some of EMS ambulance agencies. The participants were purposively selected.

3.6 Data collection tools

Quantitative data was collected using two pre-coded tools; questionnaires, these were standardised by a pre-test on a few respondents and adjustments done accordingly (Appendix III). An ambulance equipment checklist (Appendix IV) adopted from the draft of the Kenya Ambulance Act draft; detailing some of the minimum number and type of equipment on board an ambulance was also utilised. The tools used for the collection of qualitative data were interviews guides and focused group discussion guides (Appendices I and II respectively).

3.7 Data collection

3.7.1 Collection of quantitative data

The questionnaires were self-administered at the EMTs' work stations; the agencies and stand-by locations to increase the response rates. Forty four questionnaires were filled. The ambulance equipment checklist (Appendix IV) was ticked off after visual confirmation of each item per ambulance; again this was done both at the agency and standby-by locations.

3.7.2 Collection of qualitative data

Data collection was through a semi-structured interview guide (Flick, 2002). The responses from each interview were scrutinised and then used to either rephrase the questions for the subsequent interview or raise new questions for clarification so as to

obtain the deeper meaning of responses to attain concrete descriptions (Sawey, 2011). This process allowed for the use of probing questions to clarify information and gain additional data whilst verifying positions previously uttered (DiCicco-Bloom & Crabtree, 2006; Hill *et al*, 2005; Knox& Burkard, 2009).

Two focus group discussions (FGDs) were conducted; one for each gender, each lasted approximately two hours. Both FGDs occurred at a mutually agreed upon, neutral location away from the influence of their agency management. Each discussion began with general questions about the participants' reason for joining the EMS field, then what factors facilitated or hindered provision of quality EMS services. Probing questions were also used to clarify information and gain additional data. The FGDs were moderated, tape recorded and notes taken.

3.8 Data Management and Data Analysis

Both the quantitative and qualitative data were collected concurrently and then merged. Data analysis was conducted simultaneously with data collection. The pre-coded questions from the questionnaire and pre-coded checklist; were edited for correctness and entered into MS-Excel computer database application software (Microsoft corporation, US) for descriptive analysis of mean, median and interquartile ranges.

3.8.1 Analysis of quantitative data

Data analysis involved descriptive statistics of median and interquartile ranges. The amount of quantitative data collected allowed for manual use of MS-Excel computer database application software (Microsoft corporation, US) for descriptive analysis.

3.8.2 Analysis of qualitative data

All qualitative data from both the interviews and FDGs was analysed manually using the constant comparative method of open, axial and selective coding (O'Connor, 2008;

Strauss & Corbin, 1990; Strauss & Corbin 1998). These are elements of the grounded theory approach as done in related studies (Haghparast-Bidgoli *et al.*, 2010; Bigham *et al.*, 2010).

During open coding several specific but descriptive codes were observed from the raw data (Strauss & Corbin, 1990). In axial coding these observations were then scrutinised within their contexts in frequency, form and meaning to identify relationships between them, leading to the integration of some; into interpretive codes of data. Each additional interpretive code noted during analysis was compared against the others for similarities or differences and grouped accordingly (Dey, 1999). Selective coding was done to the point of theoretical saturation to determine the emergent categories, which were taken to be similar to factors in this study.

3.9 Ethical Considerations

The Ethics Review Committee of Kenya Medical Research Institute (KEMRI) approved the study protocol (Appendix V). Informed verbal consent was sought from all participants after they had been explained to that there existed no potential risk of harm either physically or career-wise associated with participating in this study. The benefits were awareness of various continuous medical education courses relevant to Emergency Medical Services available to them; that would enhance the quality of services they provide to the community. Participants were also informed that their participation was on a voluntary basis.

3.10 Rigor and validity

Collection and analysis of qualitative data can be biased by the subjective interpretation of the researcher (Salsali *et al.*, 2003; Streubert & Carpenter, 2003). In order to retain rigor and validity this study followed the example of the study conducted in Iran (Haghparast-Bidgoli *et al.*, 2010); of using a combination of, constant comparison,

within-method triangulation and methodological triangulation was utilised to retain rigor and validity (Denzin, 1970).

During constant comparison of the grounded theory approach, new data was compared to the categories identified from the first data set and then to each other for verification and development of categories. Within-method triangulation involved rephrasing the questions and varying their sequence per interview, where necessary (Bryman, 2003). The tenet of methodological triangulation was observed by virtue that data was collected via in-depth interviews, FGDs, questionnaires and the observation method.

CHAPTER FOUR

RESULTS

Forty four questionnaires were completed, two focus group discussions were conducted; one for female EMTs the other for male EMTs, and nine in-depth interviews were conducted with the operational managers of ambulance agencies.

4.1 Emergency Medical Technicians' (EMTs) specific capacity indicators to provide emergency medical services

The capacity of EMTs to provide quality emergency medical services was evaluated on basis of; EMS training undertaken, possession of a valid practising licenses, EMS career which was their job description at the ambulance agencies and their EMT field experience.

The gender distribution of the EMTs was that 77.3 % (34) of the forty four participants were male (Table 4.1).

Table 4.1: Gender distribution of the EMTs

EMTs	Frequency n=44	%
Female	10	22.7
Male	34	77.3
Total	44	100

All the forty four participating EMTs were above eighteen years (>18yrs). Thirty four point one percent; 34.1% (15) of the EMTs were between 26-30 years, while 2.3% (1) were between 51-55 years (Table 4.2).

Table 4.2: Age of EMS personnel in years

Age in years	Frequency	%
21-25	11	25
26-30	15	34.1
31-35	9	20.5
36-40	3	6.8
41-45	5	11.4
46-50	3	6.8
51-55	1	2.3
Total	44	100

Interquartile range (IQR) = 26-35 years

Eighty four point one percent or 84.1% (37) of the EMTs had undertaken formal prehospital EMS training (Table 4.3) and 77.2% (34) of them had been trained as EMT-1s (Table 4.4).

Table 4.3: Agency personnel with training in EMS

Trained in EMS	Frequency	%
	n=44	
Trained	37	84.1
Not trained	7	15.9
Total	44	100

Table 4.4: Level of EMS training attained

EMT level	Frequency	%
	n=44	
EMT- 1	34	77.2
EMT- Basic	3	6.8
N/A	7	15.9
Total	44	100

50% (22) of the participants were not trained on any continuous medical education course to augment their initial EMS training. Though, 40.9% (18) had undertaken the current BLS course offered by the American Heart Association (AHA) (Table 4.6).

Table 4.5: Continuous Medical Education courses attended by the EMT's

Course attended	Frequency	%
Current BLS by AHA	18	40.9
Current ALS by AHA	11	25
Other Specify;		
ATLS	2	4.6
PALS	1	2.3
Occupational Safety & Health	1	2.3
Nursing diploma	1	2.3
Pharmacology	1	2.3
None attended	22	50

Multiple responses allowed

BLS –Basic Life Support

ATLS –Advanced Trauma Life Support

AHA- American Heart Association

PALS –Paediatric Advanced Life Support

ALS- Advanced Life Support

In relation to synchronization of incident response efforts which is attained by application of the incident command system (ICS) course as explained by KCEMT, 88.6% (39) had already been trained (Table 4.7).

Table 4.6: EMS personnel trained in ICS

	Frequency	%
Trained	39	88.6
Not trained	5	11.4
Total	44	100

Only 11(25%) possessed a valid EMT practising license (Table 4.5), suggesting to the fact that the rest had not undertaken the EMT refresher course to renew their licenses.

Table 4.7: EMTs with valid EMT licenses

License status	Frequency	%
Valid	11	25.0
Expired	23	52.3
N/A	10	22.7
Total	44	100

There were two main job options for the EMTs at the agencies, either to work as an EMT or the combination of an EMT and ambulance operator. 40.9% (18) worked as EMTs, 20.5% (9) as the combination of an EMT and ambulance operator (Table 4.8).

Table 4.8: Job description of respondents at ambulance agency

Job Description	Frequency	%
EMT only	18	40.9
EMD only	2	4.5
Ambulance operator only	6	13.6
EMT + Ambulance operator	9	20.5
EMD + EMT/ Ambulance operator	4	9.1
<i>Other Specify;</i>		
Rescue & Fire Instructor	1	2.3
Nurse	2	4.6
Medical stores	1	2.3
Ambulance supervisor	1	2.3
Total	44	100

EMT- Emergency Medical Technician EMD- Emergency Medical Dispatcher

52.3% (23) of the 44 respondents; had between 1 to 5 years of field experience as EMTs (Table 4.9).

Table 4.9: Duration of field work as an EMT in years

	Frequency	%
Less than 1 year	9	20.5
1-5 Years	23	52.3
More than 5 Years	12	27.3
Total	44	100

4.2 Perceptions of EMS personnel towards provision of emergency medical services

The gender distribution of the interviewees and FGD participants had more males than females (Table 4.10).

Table 4.10: Gender distribution of interviewees and Focused Group Discussion participants

	Female	Male	Totals
Interview –ambulance agency managers	1	8	9
Focused Group Discussion –EMTs	4	8	12
TOTAL	5	16	21

Using constant comparison for analysis of qualitative data from both the interviews and FGDs; four categories and one core category emerged as the factors influencing provision of EMS in Nairobi. The four categories/factors and main common category/factor were: subjective EMS standards, availability and distribution of EMS resources, EMS awareness and existing road infrastructure. The core category and common factor to the other four was identified as the ‘the role of the government in EMS implementation’ presented in section 4.2.3.

Quantitative data on perception on EMS from the questionnaires filled in by the EMTs is represented in section 4.2.2.

4.2.1 Perceptions of ambulance agency managers towards provision of emergency medical services

Subjective EMS standards; defined as the non-standardised and non-regulated manner of providing prehospital EMS, determined by the individual agency managers. To

determine protocols on appropriate medical procedures the agencies had medical control in one form or another. The medical control also provides medical advice to EMTs in the field. *“A quality assurance supervisor serves as the medical direction”.* (Interviewee 2)

“Experienced staff provides advice to those in the field”. (Interviewee 9)

The managers also agreed there was lack of uniform regulations on agencies' standards of practise, each agency created its own regulations, on the minimum level of EMS training of its personnel, definitions of a fully stocked ambulance and corresponding number of trained emergency medical technicians (EMTs) as per the type of prehospital EMS provided. One manager proposed that an EMS regulatory body be created.

‘All prehospital EMS agencies to be put under one regulating body under which all EMS personnel are answerable, it’s board is to consist of persons well versed in prehospital EMS and representatives of all agencies to be part of the body for adequate representation.’(Interviewee 3)

The EMS Standards also involved having a multi-agency response policy, this was identified as lacking. *“As EMS agencies we do not have a standard operating procedure directing multi-agency response so we end up with duplication of efforts and lack of an effective overall response.”* (Interviewee 6)

The participants collectively concluded that the surest way of curbing the independent determination of what constituted EMS standards by agency managers and the unregulated manner of service provision would be through the creation and enforcement of an EMS bill by the government.

“We need a government bill to define and guide our services. This bill will also make provisions for enforcement of regulatory measures.” (Interviewee 9)

Availability and distribution of EMS resources; was defined as the availability and distribution of Ambulance equipment and accompanying trained personnel. Both function as a unit and were conjointly labelled as resources. Resources were reported as being available providing mainly BLS services. One agency had the equipment to provide both basic life support (BLS) and advanced life support (ALS) services.

“Only qualified personnel are hired.” (Interviewee 4)

“I have invested in high quality state of the art equipment for our objective is to be the leading agency in ALS in the country.”(Interviewee 7)

The distribution of resources and their agencies, within individual agencies and across the county was concentrated within the central business district (CBD) of Nairobi. According to the ambulance agency managers the concentration of agencies in the CBD was attributed to limited funds due to high operational costs and the existence of a small pool of paying clientele. The former limited acquisition of additional resources to increase number of branches and the latter provided little incentive to expand the agency into branches.

“Our ambulance fleet is small as compared to the needs of the society.” (Interviewee 2)

“The capacity of the agency is superseded by the community’s needs.”(Interviewee 3)

It was proposed by the ambulance agency managers that; once the government subsidized the cost of services and reduced the importation tax on ambulance equipment; the agencies would make profitable returns and have funds to expand the size of their agencies.

“Addition of new equipment would increase if we didn’t have the exorbitant taxes at the port in addition to the already high purchasing costs; the total cost is prohibitive considering there also a maintenance budget to be factored.” (Interviewee 5)

EMS Awareness was defined as the basic knowledge on the description and purpose of prehospital EMS. A lack of proper awareness on the scope of these services, their role in the community and availability, was present in two types of persons. Senior administrative managers from within the agency and those who were not part of the agency these were the general public and insurance firms.

*“There is no insurance cover specific for prehospital ambulance services providers.”
(Interviewee 3)*

Not only was there public ignorance on prehospital EMS there was also the misconception that by virtue that these services were being offered during an unexpected emergency, they were also to be cost free. This was further compounded by the generally low economic status of most; meaning that they were unable to afford the services. Those who could pay formed the small client pool that was competed for by the agencies.

*“People generally view payment of ambulances services as an unnecessary expense.”
(Interviewee 8)*

The nine agency managers emphasised that their senior management were uncooperative and placed impractical restrictions of procurement bureaucracy and allocation of inadequate operations budgets; mainly out of ignorance on pre-hospital EMS. This was viewed as a negative influence on service provision. One manager of an ambulance agency affiliated to a hospital said, *“The hospital management is ignorant of prehospital EMS it impedes progress by dismissing all ideas and suggestions from the agency on how these services should be provided, instead it implements it own ideas which are more often than not, impractical.”*(Interviewee 6)

“We are given insufficient funds to run the agency, even after providing appeals justifying a substantial increase of the allocated budget.”(Interviewee 4)

The managers stated that despite the fact that prehospital EMS in Kenya was relatively new it was a void reason for the government not to acknowledge it as a valid source of healthcare thus curbing the widespread ignorance on prehospital EMS.

“The government has the mandate to and overdue duty of officially incorporating our services within the national healthcare system. It also has the main responsibility of conducting mass awareness campaigns on the same.” (Interviewee 1)

Existing road infrastructure encompassed the state of existing roads within Nairobi. The roads were described by the agency managers as non-conducive to provision of quality services due to poor maintenance, lack of extensive networks and lack of ambulance lanes.

“Nairobi has a poor road infrastructure and constant congested traffic jams this causes a prolonged response time, extending beyond the golden hour rule reducing the chances of a positive outcome of the casualty.” (Interviewee 1)

4.2.2 Perception of the EMTs towards provision of emergency medical services

The perception of the EMTs towards provision of emergency medical services was provided by what the EMTs considered to be the components of quality EMS (Table 4.11) and the responses given during the focus group discussion summarised below (Table 4.12).

Table 4.11: Components of quality EMS

	Frequency	%
Properly trained personnel	38	86.4
Adequate equipment at EMS agency	32	72.7
Cooperation among other EMS agencies	31	70.5
Adequate personnel per shift	27	61.4
Additional comments;		
Enforcement of EMS standards on equipment & training	42	95.5
Good working conditions *	40	90.9
Public aware of EMS	33	75

*** adequate salaries, provision of security when dispatched to unsafe regions, reasonable shift hours, boosting of staff morale, opportunities to further career in agency**

Multiple responses allowed

Data from the female and male FGDs generated four categories similar to those from the interviewees. What differed were the perceptions on some of the categories' contents (Table 4.12).

Table 4.12: Summary quotes of categories from data of the focus group discussions

Category		Quote
1. Subjective standards	EMS	<p><i>“We have responded to emergencies with other agencies but there is no cooperation, everyone does their own thing</i></p> <p><i>“There is no online medical direction to refer to; we do the best we can for the casualty and save the questions for the doctor at the receiving hospital.”</i></p>
2. Availability and distribution of resources	EMS	<p><i>“At times we work 24 hour shifts because there are not enough EMTs per shift.”</i></p> <p><i>“We don’t have enough equipment and we are forced to improvise.”</i></p>
3. EMS awareness		<p><i>“The shift hours are erratic, one could have gone for a sixteen hour shift only to be told to go for a twenty four shift immediately after, and these hours will not be accounted for as overtime.”</i></p> <p><i>“When we arrive at the scene of an accident, the bystanders at times forcefully pile victims into the ambulance it is as if the ambulance is a taxi.”</i></p>
4. Existing infrastructure	road	<p><i>“Dual carriage roads need to be expanded with more lanes, so that we don’t have to drive on the wrong side during an emergency because of jam.”</i></p>

A more detailed description of the knowledge and perceptions on EMS from the FGD participants; is detailed below; within the four emergent categories.

Subjective EMS Standards was defined as non-standardized directives and non-regulated manner of EMS provision. The FGD participants described the current standards as being low and inconsistent. The deficits were noted in the curriculum content, comprehensiveness of the training, attendance of CMEs -especially the EMT refresher course which was mandatory for license renewal- , qualification requirements of hired EMTs, policies directing multi-agency responses and presence of medical control. The latter deficit disputed the claim by agency managers of providing a form of medical control to guide the EMTs while in the field.

“The EMT course lacks sufficient content to qualify EMTs using international standards.”(Participant 1)

“Not every ambulance staff member has the minimum training and qualifications to work in the ambulance.”(Participant 3)

“There is no online medical direction to refer to; we do the best we can for the casualty and save the questions for the doctor at the receiving hospital.”(Participant 6)

Availability and distribution of resources was defined as the availability and distribution of ambulance equipment; and accompanying trained personnel. The current resource of trained personnel and equipment was identified as scare. There was also a lack of first responders who normally formed the first tier of an EMS structure.

“At times we work 24 hour shifts because there are not enough EMTs per shift.”(Participant 4)

“We don’t have an established EMS structure, this is usually experienced during accidents; the bystanders begin some form of trial and error treatment which the EMTs have to undo or try to quickly modify as they transport the casualty to a hospital that

may either undo or continue care because of adequacy of their staff training and equipment.”(Participant 8)

The EMTs also raised concerns that even after training there was lack of an EMS environment that was conducive in which to practise the acquired skills. There also lacked a work environment after training and subsequent employment that fostered career development.

“There are no labs available with training equipment and accessible trainers for us to practise and hone our practical skills.”(Participant 2)

“My job description for the past three years is of an ambulance operator, even though I can medically assist a casualty due to my EMT training I am only allowed to drive the ambulance while the nurse attends to the casualty.”(Participant 8)

EMS awareness characterized the basic knowledge on the description and purpose of EMS. A lack of proper awareness on the scope of these services, their role in the community and availability, was present in two types of persons: agency managers and those who were not part of the agency these were the general public and traffic police and staff at the receiving medical facility.

Agency managers were described as being inadequately informed on EMS and therefore provided poor working conditions; the remunerations were low compared to the EMTs’ qualifications, shift hours were unreasonable and there were few opportunities to further one’s career in the agency.

“I am a certified EMT; I perform my work well yet am paid a very low salary. For our type of work we need a worthwhile pay.”(Participant 7)

There was a unanimous concern among the EMTs that the few opportunities to further one’s career within the agency led to discontent and job dissatisfaction. The hired EMTs

were mostly offered the two main job descriptions at the agencies either as EMTs or a combination of an EMT and ambulance operator. This was despite the fact that some of the EMTs had either acquired additional training relevant to EMS or due to their varied previous educational backgrounds had more skills to offer to the agency which were unacknowledged.

“My job description for the past three years is of an ambulance operator, even though I can medically assist a casualty due to my EMT training I am only allowed to drive the ambulance while the nurse attends to the casualty.”(Participant 2)

Public awareness of EMS was identified as crucial to quality service provision. The lack of awareness of the role and basic application of EMS was identified as being present amongst non-EMS persons; hospital staff, general public, traffic police. There was little effective cooperation offered from these quarters.

“Some hospitals have staff at the casualty departments who do not even know how to perform CPR disrupting the expected continuity of care, this is discouraging.”(Participant 5)

“Family members don’t know how to recognise an emergency and they delay calling for help, when they do call it is when their relative has become critical.”(Participant 3)

“Traffic policemen are uncooperative they do not clear traffic at every ambulance siren, it could be they assume that not all ambulance sirens have an emergency case being attended to.”(Participant 7)

Existing road infrastructure delineated the state of existing roads within Nairobi. They were described as non-conducive to quality emergency medical services provision due to poor maintenance, lack of extensive networks and lack of ambulance lanes.

“The roads have many potholes which motorists try to avoid this worsening the jam.”(Participant 7)

4.2.3 The role of the government in EMS implementation

By utilising constant comparison of the grounded theory approach to analyse qualitative data generated from both the interviews and focus group discussions in the study; the emergent core category/factor was identified as, ‘the role of the government in EMS implementation’. This category/ factor linked all the four emergent categories: subjective EMS standards, availability and distribution of EMS resources, EMS awareness and existing road infrastructure.

The study participants acknowledged that the Kenyan government had yet to enact a bill that would define EMS, its scope and expected standards of practice. This was believed to be the reason why ambulance agencies were unregulated and why senior agency management; created subjective policies. Consequently there was no guarantee of quality services being uniformly provided. The study participants also emphasised that the lack of EMS standards and guidelines resulted in a disorganised and wasteful multiagency response as the responders had undefined roles during an incident.

For ease of acquisition and increased availability of an ambulance service, it was suggested that the government provide tax incentives in the spirit of a public-private-partnership and equitably distribute private and public EMS resources. The latter would be achieved via a centralised control centre that was to receive and dispatch emergency calls as per the location and capacity of an agency. There was consensus amongst the agency managers that there was need for an increase in the agencies’ operational funding to facilitate increased acquisition of resources. It was proposed that this would be achieved through both the receipt of government grants and reimbursement from the government; of costs borne; while rendering services during road traffic accidents and multi-agency responses in the public interest or where private health insurance was

absent. This in turn would negate the need for consumer fees-for-service and the resultant out-of-pocket expenditure.

According to the study participants, societal ignorance on the necessity of EMS and its role in healthcare provision was to be countered by a government enacted bill. This bill would direct the Ministry of Health to, integrate EMS with other medical services and register appropriately trained EMS personnel as healthcare professionals. The study participants also suggested that awareness could be further enhanced by using the media to host educational campaigns on EMS, funded by the government of-course. As concerns existing road infrastructure, emphasis was placed on the fact that creation of roads, road networks their repair and maintenance was the sole responsibility of the government for they were public goods.

4.3 Resource capacity on-board the ambulances within the agencies

The phrase ‘resources’ was used to refer to both personnel and equipment - ambulances and onboard equipment. The resource capacity of the ambulance agencies was measured via observation using a checklist, questionnaires filled by EMTs and interviews directed at the agency managers.

Three of the nine agencies studied had branches outside Nairobi as reported by the specific agency managers. The resource capacity on-board the ambulances within Nairobi was; two EMTs per ambulance on average (Table 4.13) and 2 to 6 ambulances per shift (Table 4.14).

Table 4.13: EMTs working per ambulance

EMTs per ambulance	Frequency	%
0	1	2.3
1	15	34.1
2	21	47.7
3	6	13.6
4	1	2.3
Total	44	100

Table 4.14: Number of ambulances per shift

Ambulances per Shift	Frequency	%
0	1	2.3
1	8	18.2
2	14	31.8
3	6	13.6
4	3	6.8
6	6	13.6
7	1	2.3
8	1	2.3
9	4	9.1
Total	44	100.0

Median = 2

Interquartile Range = (2-6)

Thirty four ambulances in total from the various agencies were included in the study. 44.1% (15) of the ambulances were fully stocked as per the basic minimum requirements for a BLS ambulance as detailed in the Kenya Ambulance Act draft (Table 4.15). This result contradicted the statements of three agency managers who declared that their agencies owned ALS ambulances.

Table 4.15: Total number of equipment in the ambulances

Equipment total in ambulance	Frequency of ambulances with the equipment total N=34	% of ambulance with the equipment total
13	15	44.1
12	3	8.8
11	7	20.6
10	5	14.7
9	2	5.9
7	1	2.9
4	1	2.9
Totals	34	100

The type of equipment that lacked in a majority of the ambulances was the patient monitor, only 58.8% (20) had this piece of equipment (Table 4.16).

Table 4.16: Number of ambulances stocked with a specific type of equipment

Equipment description	Frequency of ambulances with the equipment	%
	N=34	
Serviceable oxygen tank	32	94.1
Oxygen masks of adult and paediatric sizes	33	97.1
Serviceable suction machine and suction catheters	27	79.4
Cervical collars of different sizes or adjustable	31	91.2
Spine board & head pads	32	94.1
Stretcher straps	28	82.4
Bag-Valve Machine both adult & paediatric sizes	32	94.1
Patient monitor	20	58.8
Stethoscope	25	73.5
Disposal container for contaminated materials & dressings	28	82.4
Sharps' container	31	91.2
Body Substance Isolation equipment for ambulance attendants	31	91.2
Dressings of various sizes	34	100

Multiple responses allowed

15(44.1%) of the ambulances had a total of 13 pieces of equipment

3(9%) of the ambulances had a total of 12 pieces of equipment

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

The male dominance of 77.3% among the EMS personnel in this study is consistent with the gender make-up of the EMS in developed countries (Gonsoulin & Palmer, 1998; NHTSA, 2008). In relation to training, 86.4% of the EMTs identified properly trained personnel as one component of quality EMS and they described their EMT course as being inferior to international standards. This opinion was divergent to research findings that it was necessary for developing countries -Kenya being one of them- to formulate training curricula applicable to their available resources and present capabilities (Kobusingye *et al.*, 2005; Sasser *et al.*, 2005) which was the case of the proffered EMT-1 course. Nevertheless the pursuit of continuous medical education courses (CMEs) by 50% of the EMTs; in addition to the initial EMS training, is likely to have a positive impact on the provision of prehospital EMS. Studies have shown that regular training leads to expansion of psychomotor skills for a variety of emergencies, quality improvement of mode of service delivery and reduction of mortality rates (Ali *et al.*, 1997; Arreola-Risa *et al.*, 2000; Ziv *et al.*, 2000). In contrast, the other 50% of EMTs in this study had not attended any CME and more than 50% of the entire sample had not attended the EMT refresher course, despite; the latter being the mandatory requirement for retention of certification, licensure and registration (Katz & Falk, 2001). This implies a deficit in knowledge, skill and resultant quality of services rendered (Mock *et al.*, 2003; Haghparast-Bidgoli *et al.*, 2010). The few career opportunities within the Kenyan ambulance agencies may have also played the role of a poor incentive for attending CMEs due to the resultant job dissatisfaction. 90.9% of the EMTs stated that quality EMS encompassed good working conditions which were described as; opportunities to further their careers within the agencies and boosting of staff morale. It

has been shown that job satisfaction translates to a high morale and desire for personal growth and development (Chapman *et al.*, 2019).

In this study one perception was that, the disregard for prehospital EMS by the government and by health policy makers; the Kenyan MoH, resulted in an independently functioning EMS which lacked formalised and legally enacted EMS standards that provide governance. Thus, the ensuing consequences were creation of subjective EMS standards, misguided administrative decisions and widespread lack of adequate awareness and misconceptions on EMS. This is in contrast with other countries that have EMS as an integrated component of the government's Ministry of Health with formally set standards to regulate these services. This integration has positive influences on service provision and patient outcome (Nikkanen *et al.*, 1998; Bledsoe & Cherry, 2000). It was observed by the study participants that some of the subjective EMS standards included the different forms of medical control adapted by their ambulance agencies. This denotes a lack of assurance that the EMS direction given would have been approved by persons trained in prehospital care and would therefore also be medically sound (Smith *et al.*, 2007; Holroyd *et al.*, 2007). Another perception on subjective EMS standards was how agencies interpreted to be right way of conducting a joint operations during an incident. The study EMTs indicated that the current disorganised manner of incident response was on account of lack of an incident response policy to coordinate their efforts. 70.5% of them agreed that there was a need for cooperation among agencies. Previous studies have shown that consequences of a deficit in an incident response policy caused uncoordinated multiagency responses (Khankeh *et al.*, 2007; Haghparast-Bidgoli *et al.*, 2010), on-scene discord, wastage of resources, and lack of cooperation. Consequently this causes overall ineffectiveness (Mock *et al.* 2003; Khankeh *et al.* 2007; Pourhosseini, 2015). This is the risk that Kenya faces despite 88.6% of the EMT in this study having been trained on ICS; which is applied to coordinate multi-agency incident management and there lacking a central control room to provide coordination via intentional information dissemination to

responding agencies. Yet this is one of the recommendations by the WHO on the aspects of a detailed incident response (Sasser *et al.*, 2005). According to this study the lack of standards to govern EMS in Kenya may have also contributed to misguided administrative decisions, by giving leeway to unregulated leadership modes that were deemed by the EMS personnel to be a constrain to development. In agreement to this; are other studies done in Iran and Ghana, whose findings were that, improper and misleading EMS administrative decision-making was a negative influence to quality service provision (Mock *et al.*, 2003; Haghparast-Bidgoli *et al.*, 2010).

An observation in this study was the disparity in perception between ambulance agency managers and EMTs on EMS resources; ambulance equipment and accompanying trained personnel. Whereas the managers claimed that resources were available, EMTs stated the opposite. The EMTs indicated that they lacked the appropriate equipment to complement their current skills. 72.7% of the EMTs advocated for adequate equipment as a necessity to effective work output. Lack of adequate and appropriate equipment has been found to have a probable profoundly negative effect on the outcome of the casualty (Zarei *et al.*, 2013). Though, both the agency managers and EMTs agreed that there was poor distribution of existing EMS resources, with 61.4% of the EMTs identifying the need for adequate personnel per shift. This state of poorly distributed resources was indicated by the managers; to be on account of limited funds for agency expansion, due to high operational funds. As found in this study, insufficient resources and their inadequate distribution has a negative influence on service provision this was echoed in studies done in other developing countries (Modagheh *et al.*, 2002; Mock *et al.*, 2003; Haghparast-Bidgoli *et al.*, 2010).

Lack of awareness; on the purpose of EMS by persons outside the ambulance agency was identified in the study from the FGDs and interviews; as a hindrance to service provision and main cause of underutilisation of these essential services. A countermeasure to this; has been found to be government funded programs aired

regularly on the media (Arreola-Risa *et al.*, 2000). The overall effect is a cooperative public, their positive involvement as impromptu first responders during on-scene management and improved outcome for the casualty (Ali *et al.*, 1997; Husum *et al.*, 2003; Sasser *et al.*, 2005). This awareness or community education on how to access and utilize EMS has been found to be a core component of healthcare provision and form of reducing the burden of disease in developing countries (Razzak & Kellermann, 2002).

Prevalent poor standards or the dilapidated state and limited networks of road infrastructure, was identified as an interference to the conduit that served as a link between accessing a casualty on-scene and expedient transport to the nearest case-relevant health facility (Hendrickson, 2000). This finding posed a negative influence to provision of prehospital EMS and resonated with the findings of similar previous studies (Razzak & Kellermann, 2002; Haghparast-Bidgoli *et al.*, 2010).

Resource capacity of the ambulance agencies that were studied was identified as being low, 55.9% of the ambulances in this study lacked all the equipment to qualify them as BLS ambulances as per the Kenya Ambulance Act draft (KCEMT, 2009). Therefore the agencies that claimed to own ALS ambulances had neither had the appropriate equipment nor paramedics to man the advanced ambulances. ALS ambulances must have all the equipment in a BLS ambulance plus additional, and the level of training of the personnel must also accordingly be advanced (ACSCT, 2009). In addition, the allotment of two EMTs per ambulance and a total of two ambulances per shift by a majority of the agencies were described by the EMTs as being impractical. They expounded that this led to overworked personnel and a constraint in both the number of calls that could be attended to at a time and those that could be dispatched to an incident scene whilst still retaining enough resources to serve the rest of the society. As found in this study and echoed in studies done in other developing countries, adequate resources were necessary for service delivery (Haghparast-Bidgoli *et al.*, 2010).

5.2 Conclusions

The EMTs in Nairobi are capable of providing EMS services based on their current training and years of field experience. Attendance of continuous trainings in the CMEs will lead to better service provision.

The overall perception of EMS personnel towards service provision is that; the regulated establishment and focused development of EMS in Nairobi is determined by the extent of involvement and engagement of relevant organs within both the national government and county governments.

Ambulance agencies are undermanned and ill-equipped to serve the healthcare demands of Nairobi County; these serve as a detrimental influence to service provision.

5.3 Recommendations

The ministry of health of the national government together with KCEMT are to create an EMS regulatory board. This board shall have the mandate to; determine EMT prequalification requirements, streamline the curriculum content and format of training delivery, determine the regulations for the requirements of retaining an EMT practising license and provide approval to prospective EMS training institutions. The board shall also take disciplinary actions to any member who contravenes its stipulated regulations.

The ministry of health of the national government together with KCEMT to create and enact an EMS bill that will include four sections; definition of EMS, its scope and expected standards of practice, section two will include the guidelines for the creation of an EMS regulatory board, section three; measures of integrating EMS within the national and county health systems. The fourth section is to include; the provisions for the creating of a national incident response policy. The county health services within individual county governments to adhere to and enforce the EMS bill.

The Ministry of Industry, Trade and Cooperatives of the national government to impose zero taxes on imports of ambulance equipment, this shall act as the incentive to purchase more equipment. The county health services within individual county governments to create private-public-partnerships between themselves and ambulance agencies; whereby there shall be grants and reimbursements for costs borne for services rendered during 'good Samaritan' calls and incident responses. These will reduce agency operational costs and encourage expansion of the agencies.

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APPENDICES

Appendix I: In-Depth Interview Guide

TITLE: SITUATION ANALYSIS OF THE PROVISION OF PREHOSPITAL EMERGENCY MEDICAL SERVICES IN THE NAIROBI COUNTY, KENYA.

FORM: _____

DATE: _____

INVESTIGATOR: _____

1. What is the role of EMS in healthcare provision?
2. What type of clients do you serve?
3. How many branches does your agency have?
4. How many ambulance personnel are currently hired?
5. What cadre are these personnel?
6. How many serviceable ambulances does your company own?
7. In your perception what constitutes quality EMS?
8. Who determines the protocols/ standards that define this quality?
9. How does your company achieve and maintain this quality service output?
10. What challenges does your company face in provision of quality ambulance services?
11. What solutions and strategies are in place or do you propose for these challenges?

Appendix II: Focused Group Discussion Guide

TITLE: SITUATION ANALYSIS OF THE PROVISION OF PREHOSPITAL EMERGENCY MEDICAL SERVICES IN THE NAIROBI COUNTY, KENYA.

FORM NO.: _____

DATE: _____

INVESTIGATOR: _____

1. What is the history of EMS in Kenya?
2. What is the role of EMS in healthcare provision?
3. Does Nairobi County have an adequate EMS system?
4. What challenges do you face as an EMT?
5. What solutions do you propose for these challenges?
6. What is your perception/ attitude towards provision of quality EMS?
7. What is the perception of patient/ client towards EMS?

Appendix III: Questionnaires

TITLE: SITUATION ANALYSIS OF THE PROVISION OF PREHOSPITAL EMERGENCY MEDICAL SERVICES IN THE NAIROBI COUNTY, KENYA.

FORM NO.: _____

DATE: _____

INVESTIGATOR: _____

Socio-Demographic information on respondents

1. Gender (tick where F 1 M 2 applicable)

2. How old are you? _____

3. What is your job description at this Ambulance Agency? (Tick where applicable)

	Job Description	TICK
1	EMT only	
2	EMD only	
3	AMBULANCE OPERATOR only	
4	EMT + AMBULANCE OPERATOR	
5	EMD + EMT AMBULANCE OPERATOR	
Other specify;		

Professional Training of respondents

4. Have you been trained on Emergency Medical Services (EMS)? (**tick where applicable**)

YES	1
NO	2

- What level of training did you attain? (**tick where applicable**)

	Level of training attained	Tick
1	EMT-Level 1	
2	EMT- Basic	
3	N/A	

5. What is the duration of the field work as an EMT that you have done? (**tick where applicable**)

	Duration of field work	Tick
1	Less than 1 year	
2	1-5 years	
3	More than 5 years	

6. Is your Emergency Medical Technician (EMT) license valid? **(Tick where applicable)**

YES	1
NO	2

7. Select the Continuous Medical Education courses you have been trained in; **(Tick where applicable)**

	COURSE	TICK
1	Current BLS course approved by AHA	
2	Current ALS course approved by AHA	
Other Specify		
None attended		

8. Have you been trained in the INCIDENT COMMAND SYSTEM course? **(Tick where applicable)**

YES 1 NO 2

Knowledge of respondents

9. Which of the following Kenyan documents relevant to EMS are you familiar with? **(Tick where applicable)**

	DOCUMENT	TICK BELOW
1	Public Health Act	
2	2010 Constitution (final draft)	
3	K. C. E. M. T Ambulance ACT Draft	

Does Nairobi County have an adequate prehospital ambulance EMS system? (**Tick where applicable**)

YES 1 | NO 2

Perception of respondents on EMS

10. In your perception, what constitutes quality pre-hospital EMS? (**Tick where applicable**)

	ASPECTS OF QUALITY SERVICE	TICK BELOW
1	Adequate equipment at EMS agency	
2	Adequate personnel per shift	
3	Properly trained personnel	
4	Cooperation among other EMS agencies	
Other ,specify:		

Capacity of EMS agency

11. How many of the personnel working per ambulance are qualified EMTs? ___

12. How many ambulances operate per shift? _____

Appendix IV: Ambulance Checklist

TITLE: SITUATION ANALYSIS OF THE PROVISION OF PREHOSPITAL EMERGENCY MEDICAL SERVICES IN THE NAIROBI COUNTY, KENYA.



FORM NO.: _____

DATE: _____

INVESTIGATOR: _____

EQUIPMENT		VEHICLES CHECKED	
		I	II
1	Serviceable oxygen tank		
2	Oxygen masks of adult and pediatric sizes		
3	Serviceable suction machine and suction catheters		
4	Cervical collars of different sizes or adjustable		
5	Spine board & head pads		
6	Stretcher straps		
7	Bag-Valve Machine both adult and pediatric sizes		
8	Patient monitor		
9	Stethoscope		
10	Disposal container for contaminated materials and dressings		
11	Sharps' container		
12	Body Substance Isolation equipment for ambulance attendants		
13	Dressings of various sizes		

Appendix V: Ethical Approval



KENYA MEDICAL RESEARCH INSTITUTE

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KEMRI/RES/7/3/1 **April 18, 2013**

TO: NYAKIIRU GICHUKI (PRINCIPAL INVESTIGATOR)

fr **THROUGH:** DR. YERI KOMBE; *forwarded 30/4/2013*
DIRECTOR, CPHR

RE: **SSC PROTOCOL NO. 2403 – REVISED (RE-SUBMISSION): SITUATION ANALYSIS OF PREHOSPITAL EMERGENCY MEDICAL SERVICES IN THE URBAN SETTING NAIROBI COUNTY, KENYA**

Make reference to your letter dated March 22, 2013, received on March 27, 2013.

We acknowledge receipt of;

- The Revised Study Protocol.
- The Revised Informed Consent Document

This is to inform you that the Ethics Review Committee (ERC) reviewed the document listed above and is satisfied that the issues raised at the 211th meeting held on 6th February, 2013 have been adequately addressed.

The study is granted approval for implementation effective this **18th day of April 2013**. Please note that authorization to conduct this study will automatically expire on **April 17, 2014**. If you plan to continue with data collection or analysis beyond this date, please submit an application for continuing approval to the ERC Secretariat by **March 7, 2014**.

Any unanticipated problems resulting from the implementation of this protocol should be brought to the attention of the ERC. You are also required to submit any proposed changes to this protocol to the ERC to initiation and advise the ERC when the study is completed or discontinued.

You may embark on the study.

Sincerely,

EAB

**Dr. Elizabeth Bukusi,
ACTING SECRETARY,
KEMRI/ETHICS REVIEW COMMITTEE**

In Search of Better Health

Appendix VI: Publication

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Contextual factors influencing provision of emergency medical services in Nairobi, Kenya

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Contextual factors influencing provision of emergency medical services in Nairobi, Kenya

ABSTRACT

Introduction: Emergency medical services or EMS has the potential to reduce mortality and morbidity. Developing countries which include most of the African states, lack these services. In Kenya the relatively new EMS is mainly provided by privately run ambulance agencies. There is insufficient information on EMS in Kenya. The objective of this study was to explore contextual factors that influence provision of EMS in Nairobi as viewed and experienced by ambulance agency managers.

Methods: A qualitative study design using elements of grounded theory was selected. Data was collected, transcribed, coded, and analyzed using constant comparison. Nine in-depth interviews were conducted with EMS ambulance agency managers.

Results: Four factors that influenced provision of EMS emerged: Subjective EMS standards, availability and distribution of resources, EMS awareness, and existing road infrastructure. The factor common to all was categorised as: ‘the role of the government in EMS implementation.’

Conclusion: The establishment and development of EMS in Nairobi is determined by the extent of involvement and engagement of the government in EMS implementation.

KEYWORDS: emergency medical services, ambulance, resource, government, Kenya.

1: INTRODUCTION

Emergency Medical Services (EMS) is the mechanism through which emergency medical care is provided on-scene and en-route to a medical facility. It often represents the first point of contact with the health system during the acute phase of life threatening emergencies and debilitating illnesses (Al-Shaqsi, 2010; Jamison *et al.*, 2006). These services have the potential to reduce morbidity and mortality rates (Razzak & Kellermann, 2002).

These services are described as insufficient and underdeveloped, in Africa and other resource-poor settings (Sasser *et al.*, 2005; Scurfield *et al.*, 2004; Arnold, 1999). Kenya is amongst the few African states with some form of organised pre-hospital EMS; albeit urban and privately owned and operated. EMS in Kenya is yet to be realised by the government as a valid source of healthcare, despite the fact that access to emergency medical treatment is the constitutionally protected right of all citizens (Wachira, 2011; The Constitution of Kenya, 2010). In contrast, the World Health Organisation accepts EMS as an integral part of a national healthcare system (Al-Shaqsi, 2010). However, hospital-based ambulance services run by the country's ministry of health for patient referral purposes are well recognized and implemented by the government (Ministry of Medical Services, 2008). However, planned patient transport and inter-facility referral does not suffice for an emergency medical system that is intended to widen access to and responsiveness of the health care system. The former does not offer public protection, early detection or acute care; it only continues care or transportation at least for those already enrolled in the health system.

These private agencies, mentioned above, are not integrated within the national healthcare system of the Ministry of Health. Instead they operate independently from any medical regulatory body, are guided by individual company policies and are enabled by the right to free economic enterprise.

There is insufficient research evidence on EMS implementation in Kenya. This study explored factors that influence provision of EMS in Kenya; as viewed and experienced by ambulance agency managers.

2: MATERIALS AND METHODS

The ethics review committee of the Kenya Medical Research Institute (KEMRI) approved the study protocol. An interpretive approach was selected for its exploratory value. Data collection was via a loosely referred to semi-structured interview guide (Flick, 2002). The sequence of questions varied per interview and the questions were constantly rephrased where necessary in the interest of ‘within-method triangulation’ to enhance data confidence (Bryman, 2003). This process allowed for the use of probing questions to clarify information and gain additional data whilst verifying positions previously uttered (DiCicco-Bloom & Crabtree, 2006; Hill *et al*, 2005; Knox & Burkard, 2009).

The ambulance agency managers were recruited through purposive sampling. The selection criterion was, managers who were in-charge of ambulance operations in agencies located within Nairobi. These agencies were heterogeneous in terms of size and duration of existence; some had higher levels of management above the operations manager.

One female and eight male managers from all nine ambulance agencies in Nairobi were interviewed between March and August 2013, after giving informed consent. Their status and contribution enabled the documentation of upstream and downstream factors in EMS implementation to the point of theoretical saturation.

All interviews were conducted by the same author (NMG). Each interview began with general questions about the participants' rationale for operating an ambulance agency followed by their perceptions about "factors influencing provision of EMS." The interviews were digitally recorded with the addition of researcher memos. The responses from each interview were scrutinised and then used to either rephrase the questions for the subsequent interview or raise new questions for clarification so as to scaffold the deeper meaning of responses to attain thick descriptions (Sawey,2011). Thus, later participants responded differently from former ones and this addressed participant bias. Following transcription, data was analysed manually using the constant comparative method of open, axial and selective coding (O'Connor, 2008; Strauss & Corbin, 1990; Strauss & Corbin1998). These are element of the grounded theory approach as applied in similar previous studies (Haghparast-Bidgoli *et al.*, 2010; Bigham *et al.*, 2010).

During open coding several specific but descriptive codes were observed from the data (Strauss & Corbin, 1990). In axial coding these codes were then scrutinised within their contexts in terms of frequency, form and meaning to identify relationships between them. This led to the integration of some; into interpretive codes of data. Each additional interpretive code noted during analysis was compared against the others for similarities or differences and grouped accordingly (Dey, 1999). Selective coding was done to the point of theoretical saturation to determine the emergent categories. Table 1 shows examples from the raw data, categories and category definitions.

RAW DATA	CATEGORY	DEFINITION
<i>"A quality assurance supervisor serves as the medical direction"</i>	Subjective EMS standards	Non-standardized directives and non-regulated manner of EMS provision
<i>"Only qualified personnel are hired."</i>	Availability and distribution of	Availability and distribution of ambulance
<i>"The capacity of the agency is</i>	distribution of	

<i>superseded by the community's needs."</i>	resources	equipment and accompanying trained personnel
<i>"The senior management is ignorant of prehospital EMS it impedes progress by dismissing all ideas and suggestions from the agency; on how these services should be provided, instead it implements it own ideas which are more often than not, impractical."</i>	EMS awareness	Basic knowledge on the description and purpose of EMS
<i>"People generally view payment of ambulances services as an unnecessary expense."</i>		
<i>"There are no designated ambulance lanes on the roads hence an unnecessarily long response time as the ambulances are forced to join the rest of the traffic."</i>	Existing road infrastructure	State of existing roads within Nairobi

Table 1: Examples –Raw Data, Categories and Category Definitions

2.1: RIGOR AND VALIDITY

Collection and analysis of qualitative data can be biased by the subjective interpretation of the researcher (Salsali *et al.*, 2003; Streubert & Carpenter, 2003). Constant comparison, peer review and within-method triangulation were utilised (Haghparast-Bidgoli *et al.*, 2010), to ensure rigor and validity. In constant comparison new data was compared to the codes identified from the first data set and then to each other for verification and development of categories. Peer review of the analysis process was conducted by the co-authors. Within-method triangulation involved rephrasing the questions and varying their sequence per interview, where necessary (Bryman, 2003).

3: RESULTS

Four categories of the factors that influence provision of EMS in Nairobi emerged: subjective EMS standards, availability and distribution of EMS resources, EMS awareness, and existing road infrastructure. The category common to the other four was categorised as: ‘the role of the government in EMS implementation.’

3.1 Subjective EMS standards; is a non-standardised and non-regulated manner of providing EMS, determined by the individual agency managers. There were differences in the forms of medical direction, standards of practise and inability to coordinate multi-agency response efforts.

To determine protocols on appropriate medical procedures the agencies had medical control in one form or another. *“A quality assurance supervisor serves as the medical direction”.* (Interviewee 2)

“Experienced staff provides advice to those in the field”. (Interviewee 9)

The managers also agreed there was a lack of uniform regulations on agencies’ standards of practise, each agency created its own regulations, on the minimum level of EMS training of its personnel, definitions of a fully stocked ambulance and corresponding number of trained emergency medical technicians (EMTs) as per the type of prehospital EMS provided. One manager proposed the solution to be the creation of a regulatory body.

‘All prehospital EMS agencies to be put under one regulating body under which all EMS personnel are answerable, it’s board is to consist of persons well versed in prehospital EMS and representatives of all agencies to be part of the body for adequate representation.’(Interviewee 3)

EMS Standards also involved having a multi-agency response policy, which would coordinate how EMS agencies respond. Thus there is no on-scene collective coordination or cooperation for each agency works as a separate entity.

“As EMS agencies we do not have a standard operating procedure directing multi-agency response so we end up with duplication of efforts and lack of an effective overall response.” (Interviewee 6)

The participants collectively concluded that the surest way of curbing the independent determination of what constituted EMS standards by agency managers and the unregulated manner of service provision would be through the creation and enforcement of an EMS bill by the government.

“We need a government bill to define and guide our services. This bill will also make provisions for enforcement of regulatory measures.” (Interviewee 9)

3.2 Availability and distribution of resources is defined as; the availability and distribution of Ambulance equipment and accompanying trained personnel. Both function as a unit and were conjointly labelled as resources.

Resources were reported as being available; some were of a particular calibre and one agency had the equipment to provide both basic life support (BLS) and advanced life support (ALS) services.

“Only qualified personnel are hired.” (Interviewee 4)

“I have invested in high quality state of the art equipment for our objective is to be the leading agency in ALS in the country.”(Interviewee 7)

The statement of resources being available was disputed by the fact that agencies usually functioned with incomplete resource units. Not all their ambulances were fully stocked. The agencies also lacked the required number of trained personnel per service; this being

two for basic life support (BLS) and three for advanced life support (ALS). Overall both the larger and smaller agencies were resource constrained to serve the entire population.

“The capacity of the agency is superseded by the community’s needs.” (Interviewee 3)

The distribution of resources and their agencies, within individual agencies and across the county was quite narrow and concentrated in one area. This was attributed to limited funds due to high operational costs and the existence of a small pool of paying clientele. The former limited acquisition of additional resources to increase number of branches and the latter provided little incentive to expand the agency into branches.

“Our ambulance fleet is small as compared to the needs of the society.” (Interviewee 2)

It was proposed that; once the government subsidized the cost of services and reduced the importation tax on ambulance equipment; the agencies would make profitable returns and have funds to expand the size of their agencies.

“Addition of new equipment would increase if we didn’t have the exorbitant taxes at the port in addition to the already high purchasing costs; the total cost is prohibitive considering there also a maintenance budget to be factored.” (Interviewee 5)

3.3 EMS Awareness is the basic knowledge on the description and purpose of EMS. A lack of proper awareness on the scope of these services, their role in the community and availability, was present in two types of persons. Some senior administrative managers from within the agency and those who were not part of the agency these were the general public and insurance firms.

“There is no insurance cover specific for prehospital ambulance services providers.” (Interviewee 3)

Not only was there lack of awareness on EMS by the public there was also the misconception that by virtue that these services were being offered during an unexpected emergency, they ought to also be cost free. This was further compounded by the generally low economic status of most people; meaning that they were unable to afford the services. Those who could pay, formed the small client pool that the agencies competed for.

*“People generally view payment of ambulances services as an unnecessary expense.”
(Interviewee 8)*

The agency managers emphasised that their senior management were uncooperative and placed impractical restrictions of procurement bureaucracy and allocation of inadequate operations budgets; mainly out of proper awareness of EMS. This was viewed as a negative influence on service provision. One manager of an ambulance agency affiliated to a hospital said, *“The hospital management is ignorant of prehospital EMS it impedes progress by dismissing all ideas and suggestions from the agency on how these services should be provided, instead it implements its own ideas which are more often than not, impractical.”*(Interviewee 6)

“We are given insufficient funds to run the agency, even after providing appeals justifying a substantial increase of the allocated budget.”(Interviewee 4)

The managers argued that despite the fact that EMS in Kenya was relatively new it was imperative for the government to acknowledge it as a valid source of healthcare. This would consequently curb the widespread lack of awareness on EMS.

“The government has the mandate to and overdue duty of officially incorporating our services within the national healthcare system. It also has the main responsibility of conducting mass awareness campaigns on the same.” (Interviewee 1)

3.4 Existing road infrastructure encompassed the state of existing roads within Nairobi. The roads were described as non-conducive to provision of quality services due to poor maintenance, lack of extensive networks and lack of ambulance lanes.

“Nairobi has a poor road infrastructure and constant congested traffic jams this causes a prolonged response time, extending beyond the golden hour rule reducing the chances of a positive outcome of the casualty.” (Interviewee 1)

3.5 The role of the government in EMS implementation: This factor linked all the emergent categories. The agency managers acknowledged that the Kenyan government had yet to enact a bill that would define pre-hospital EMS, its scope and expected standards of practice. This was believed to be the reason why ambulance agencies were unregulated and why senior agency management; created subjective policies. Consequently there was no guarantee of quality services being uniformly provided. The agency managers also emphasised that the lack of EMS standards and guidelines resulted in a disorganised and wasteful multiagency response as the responders had undefined roles during an incident.

For ease of acquisition and increased availability of an ambulance service, it was suggested that the government provide tax incentives (in the spirit of a public-private-partnership) and equitably distribute private and public EMS resources. The latter would be achieved via a centralised control centre that was to receive and dispatch emergency calls as per the location and capacity of an agency. There was consensus that there was need for an increase in the agencies’ operational funding. The participants proposed both the receipt of government grants and reimbursement from the government; of costs borne while rendering services during road traffic accidents and multi-agency responses in the public interest or where private health insurance was

absent. This would negate the need for consumer fees-for-service and the resultant out-of-pocket expenditure.

According to the participants, societal ignorance on the necessity of EMS and its role in healthcare provision was to be countered by a government enacted bill. This bill would direct the Ministry of Health to, integrate EMS with other medical services and register appropriately trained EMS personnel as health professionals. It was also suggested that awareness could be further enhanced by using the media to host educational campaigns on EMS, funded by the government of-course. The agency managers placed emphasis on the fact that creation of roads, road networks their repair and maintenance was the sole responsibility of the government for they were public goods.

4: DISCUSSION

This study finds that four factors can have influence over the provision of EMS in the urban setting of Nairobi. These are EMS standards, EMS resources, EMS agency EMS awareness and existing road infrastructure. ‘The role of the government in EMS implementation’, was identified as the core category, the government was found to be playing influential roles in all the other factors.

Existence of standards in EMS, such as medical control and a policy on multiagency response detailing use of a central control room; has a positive influence on service provision (Sasser *et al.*, 2005; Smith *et al.*, 2007; Holroyd *et al.*, 1986). While the lack of standards has a negative influence, as shown in the lack of requisite minimum training level for the hired personnel, which implies a deficit in knowledge, skill and resultant quality of services rendered (Haghparsat-Bidgoli *et al.*, 2010; Mock *et al.*, 2003). The lack of an incident response policy has also been proven in previous studies to cause uncoordinated multi-agency responses (Haghparsat-Bidgoli *et al.*, 2010; Khankeh *et al.*, 2007).

Regular EMS training of personnel is likely to have a positive impact on the provision of EMS, as studies have shown that regular training can reduce mortality rates (Arreola-Risa *et al.*, 2000; Ali *et al.*, 1997). However as emerged in this study, insufficient resources and their inadequate distribution has a negative influence on service provision-consonant with findings in other developing countries(Haghparast-Bidgoli *et al.*, 2010 Mock *et al.*, 2003; Modagheh *et al.*, 2002)

According to this study and other studies in Iran and Ghana, improper and misleading EMS administration was identified as a negative influence to quality service provision (Haghparast-Bidgoli *et al.*, 2010; Mock *et al.*, 2003).Ignorance of pre-hospital EMS by the Kenyan Ministry of Health and in other health policy makers from other developing countries is a negative influence to EMS provision as it leads to misconceptions on EMS (Jamison *et al.*, 2006; Haghparast-Bidgoli *et al.*, 2010). Public ignorance can be reduced by intentionally creating awareness thorough the media(Arreola-Risa *et al.*,2000). The overall effect will be a cooperative public their positive involvement and improved outcome for the casualty (Sasser *et al.*, 2005; Ali *et al.*, 1997; Husum *et al.*, 2003).

The low standards of road infrastructure identified in this study serve as a negative influence to provision of pre-hospital EMS as discovered in a similar study done in Iran (Haghparast-Bidgoli *et al.*, 2010).

5: LIMITATIONS

This study focused only on the views from EMS ambulance agency managers with varying resource capacities and years experiences'; in an urban setting of a developing country with an underdeveloped pre-hospital EMS. Also this study does not necessarily represent the views of the trained personnel who do the actual service provision to the public.

6: CONCLUSION

Based on the views of the agency managers, the establishment and development of pre-hospital emergency medical services in Nairobi is determined by the extent of involvement and engagement of the government in the implementation process.

7: RECOMMENDATIONS

The government is to play the overall role in the establishment of pre-hospital EMS and creation of EMS awareness. This will enhance provision of pre-hospital EMS.

Future hypotheses on pre-hospital EMS can be generated from these study results.

8: ACKNOWLEDGMENTS

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Appendix VII: List of Skills of an Emt-B & Emt-I

EMT BASIC & EMT LEVEL 1 CURRICULA

EMT BASIC CURRLCULUM*	EMT LEVEL 1 CURRICULUM**
<ul style="list-style-type: none"> • Introduction to Emergency Medical Care • Well-Being of the EMT-Basic • Medical/Legal and Ethical Issues • The Human Body • Baseline Vital Signs and SAMPLE History • Lifting and Moving Patients • Airway Management • Scene Size-Up • Initial Assessment • Focused History and Physical Exam - Trauma Patients • Focused History and Physical Exam - Medical Patients • Detailed Physical Exam • On-Going Assessment • Communications • Documentation • General Pharmacology • Respiratory Emergencies • Cardiovascular Emergencies • Diabetes Emergencies • Allergies • Poisoning/Overdose • Environmental Emergencies • Behavioral Emergencies • Obstetrics/Gynecology • Bleeding and Shock • Soft Tissue Injuries • Musculoskeletal Care • Injuries to the Head and Spine • Infants and Children • Ambulance Operations 	<ul style="list-style-type: none"> • Introduction to Emergency Medical Care • Well-Being of the EMT-Basic • Medical/Legal and Ethical Issues • The Human Body • Baseline Vital Signs and SAMPLE History • Lifting and Moving Patients • Airway Management • Scene Size-Up • Initial Assessment • Focused History and Physical Exam - Trauma Patients • Focused History and Physical Exam - Medical Patients • Detailed Physical Exam • On-Going Assessment • Communications • Documentation • General Pharmacology • Respiratory Emergencies • Cardiovascular Emergencies • Diabetes Emergencies • Allergies • Poisoning/Overdose • Environmental Emergencies • Behavioral Emergencies • Obstetrics/Gynecology • Bleeding and Shock • Soft Tissue Injuries • Musculoskeletal Care • Injuries to the Head and Spine • Infants and Children • Ambulance Operations

<ul style="list-style-type: none"> • Gaining Access 	<ul style="list-style-type: none"> • Gaining Access <p><u>ADDITIONAL COURSES</u></p> <ul style="list-style-type: none"> • Advanced Airway management • Cannulation • EKG monitoring • Incident Command System • Mass Casualty Incident • Geriatrics care • Infection Control • Emergency Medical Dispatcher • Emergency vehicle operations course • Communicable Diseases • EMS Approach to HIV-AIDS
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* EMT BASIC NATIONAL STANDARD CURRICULUM:United States Department of Transportation, National Highway Traffic and Safety Administration (NHTSA)

** EMT –ONE CURRICULUM : Avenue Recue Services