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Exploring the facilitators and challenges of Emergency Medical Services: a case of Kisii County Government.

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EXPLORING THE FACILITATORS AND CHALLENGES OF EMERGENCY MEDICAL SERVICES: A CASE OF KISII COUNTY GOVERNMENT

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AUTHOR'S DECLARATION

I declare that this work has not been previously submitted and approved for the award of degree by Strathmore University or any other university. To the best of my knowledge and belief, this project contains no material previously published or written by another person except where due reference has made.

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Date: 7th November 2021

APPROVAL

This project was reviewed and approved by the supervisor.

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ABSTRACT

Emergency medical services (EMS) are urgent interventions and procedures offered to patients to prevent disability and preserve life after the occurrence of injury or acute illness. The services usually offered in out-of-hospital setups or during transit to a definitive health facility, contribute to the overall health outcomes. Globally, the need for EMS remains critical, as over half of the global mortalities are as a result of emergency medical diseases. This study aimed to explore facilitators and challenges of implementing EMS in Kisii County using the health system building block framework. The research was a cross-sectional qualitative study that utilized interviews for data collection. The target population was 14 the personnel in the EMS department; health managers and EMS frontline workers of the Kisii County. The study findings were subjected to qualitative data analysis and finding presented. The study followed all ethical considerations.The study established that the EMS implementation has improved health services by increasing the scope of services to include referrals, medical evacuation, and health education. The main facilitators for the EMS service delivery were a dedicated, diverse and team spirited work force, good communication and coordination during the dispatch process, availability of infrastructure, medical products, and technologies, and publicly financed system. The study also revealed that the main challenges in the EMS implementation are inadequately trained workforce, staff shortages, some faulty equipment, lack of financial transparency and delays in allocation, lack of a lead agency and national policies on EMS. Based on the findings, the study recommends that EMS implementors ensure that they have well trained and adequate EMS workforce, availability of functional communication, medical and transportation infrastructure. Additionally, develop national EMS policies and publicly financed EMS systems.

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LIST OF ABBREVIATIONS

ALS - Advanced Life Support

BLS - Basic Life Support

CFIR - Consolidated Framework for Implementation Research

CHMT – County Health Management Team

DHIS – District Health Information System

ED - Emergency Department

EM - Emergency Medicine

EMRP - Emergency Medicine Residency Program

EMD - Emergency Medical Diseases

EMR - Electronic Medical Records

EMS - Emergency Medical Services

EMT - Emergency Medicine Technician

ICT – Information Communication Technology

IHD - Ischemic Heart Disease

IoM - Institute of Medicine

KHIS – Kenya Health Information System

KTRH - Kisii Teaching and Referral Hospital

LMIC – Lower-and Middle-Income Countries

MOH - Ministry of Health

NTSA – National Transport and Safety Authority

PCR - Patient Care Report

PHTLS - Pre-Hospital Trauma Life Support

RTA - Road Traffic Accident

SOP - Standard Operating Procedures

UHC - Universal Health Coverage

WHO - World Health Organization

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

This chapter presents the introduction to Emergency Medical Services implementation, its facilitators, and challenges in relation to the overall health systems components. It explores the backgrounds, problem statement, objectives, research questions, scope, and significance of the study

1.2 Background of Study

The term Emergency Medical Services (EMS) is often used interchangeably with paramedic services or ambulance services or prehospital care (Razzak, Usmani & Bhutta, 2019; WHO, 2015; Mound-Millman et al, 2017). EMS is a vital component of the health systems, that involves treatment injuries and acute illnesses that need urgent medical response without which adverse health outcomes such as disability or death would occur (Kaji, Schriger & Green, 2014). EMS services are offered at the scene of injury or illness, at home or during transportation of the patient to a health facility. Moreover, EMS is provided as soon as possible, after the occurrence of an accident or onset of symptoms. The main aim of EMS is to stabilize patients with life-threatening conditions and to preserve life (Cottrell et al., 2014). According to WHO (2018), EMS has a structure and process that includes a series of activities such as contacting the ambulance call centre, an immediate response to the scene of illness or accident, stabilization, and management of the victim. Additionally, EMS will comprise establishing communication with the nearest health facility, handing over the patient, triage, and treatment at the hospital (Zhang & Jiang, 2014).

EMS existed even in ancient history. Biblically, the book of Luke 10:34 talks about a Good Samaritan who offered emergency service to a dying man. The Samaritan dressed the victim's wounds, bandaged them after pouring wine and oil, and took him to the nearest inn for further management (Burkholder & King, 2016).

1.2.1 Emergency Medical Services System Facilitators and Models

EMS can be broadly categorized into two levels of care: Basic Life Support (BLS) and Advanced Life Support (ALS). Under BLS, there is the first responder who is often a trained EMS personnel to arrive at the scene of an emergency. Other members of the BLS team

include the ambulance driver, paramedics, emergency medical technicians (EMTs) and emergency medical dispatchers (Galvagno et al., 2015). On the other hand, ALS professionals include paramedics and physicians who possess advanced emergency medical skills such as tracheal intubation, cardioversion, resuscitation, and cardiac monitoring. Other ALS personnel include critical care specialists and trauma surgeons (Galvagno et al., 2015; Fullagar et al., 2010).

EMS models can also be categorized according to their administrative structure and lead agency. These are broadly categorised as public and private EMS models. Public EMS models are essentially designed and managed by government, either central or decentralized local governments. Private EMS providers include for-profit and non-profit organizations running independent ambulatory services (WHO, 2005).

An ideal EMS system comprises of a lead agency, medical direction, communication, transport, infrastructural facilities, human resources, financing, and community support. (WHO 2005; Brennan & Krohmer, 2006). These components are comparable to the WHO health systems framework that defines six building blocks. The desirable attributes of the WHO building blocks are consequently the facilitators of a good EMS system. The facilitators include quality services delivery, a well-performing health work force, a well-functioning health information system, equitable access to medical products, vaccines & technologies, a good health financing systems and leadership & governance (WHO, 2007). The six main components also provide a comprehensive structure for identifying gaps in the health care system.

Although, the six main facilitators of a health system contribute greatly to the overall health outcomes, their interconnectedness is equally important. A dynamic relationship exists, whereby a change in one facilitator influences the other components. Similarly, improvements in one component cannot occur without the contribution of the other facilitators (Mehmood et al., 2018; WHO, 2007). For instance, EMS systems require a good communication system that links the patient, ambulance call centre, dispatch team, frontline EMS workers and the hospitals. For the communication system to work effectively, the human resource must be well informed on the usage and protocols of the EMS process. Sufficient health financing ensures the EMS system can acquire advanced technology and repair where necessary (Plevin, 2017).

1.2.2 Challenges of Emergency Medical Services

The world records significant deaths annually due to lack of timely EMS. In 2015, 50.9% of all mortalities and 42% of all disability-adjusted life were as a result of Emergency Medical Diseases (EMD) and limited access to EMS (Razzak, Usmani & Bhutta, 2019). EMDs are more common in low and middle-income countries compared to high income countries. EMDs include diarrhoeal diseases, Ischemic Heart Disease (IHD), stroke, birth complications, lower respiratory tract infections, trauma, and injuries (Razzak, Usmani & Bhutta, 2019). More than half of the global death burden can be addressed by an efficient and responsive emergency care system (WHO, 2019). Consequently, the high global mortality rates and EMDs makes a case for the strengthening and integration of EMS in health care system (Razzak & Kellermann, 2002).

A significant proportion on the world's population lacks access to emergency medical services. For instance, in Africa, only one third of countries have EMS systems. Further, these few EMS systems only serve less than 10% of the population (Mould-Millman et al., 2017). In countries where EMS are available, the quality of care, distribution and capacity varies. Poor quality EMS results in poor health outcomes like prolonged hospital stay, disability or death (Kobusingye et al., 2006; WHO, 2005).

Of the 6 WHO building blocks and components of an EMS system, health financing has been identified as a major barrier to EMS particularly in LMICs (Nielsen et al., 2012; Chang et al., 2016). With limited financial resources, very marginal investment can be made in adequate human resources, medical equipment and products, infrastructure, and health information systems (WHO, 2007). According to Counselman et al. (2017), the capacity of a health facility is influenced by structural factors such as space, specialized equipment, drugs, and supplies. Unavailability of these structural factors is a major obstacle to the success of EMS. The challenges EMS faces in countries like Kenya include a lack of specialized equipment and personnel in the rural counties and excessive demand for EMS in the urban counties (Wachira & Martin, 2011; WHO, 2005).

In addition, EMS development is slow and most countries with underdeveloped systems lack a comprehensive curriculum for emergency medicine education. Even in countries that have attempted to introduce such curriculums, they come in form of short courses and are not yet attractive to many personnel in the health sector. Kenya for instance, lacks a national policy on

EMS or the training. As a result, training institutions independently create their own curriculum by adopting training material from established countries. Often the curriculum is not fit for the local context (Nicholson et al., 2017). Consistent training and career development of personnel is vital in empowering EMS teams to deliver quality services (Wilson & Law, 2016).

Leadership and medical direction are also a challenge in EMS implementation. Leadership and governance gaps include lack EMS national policies, legislation, and regulation from a lead agency such as government (Nielsen et al., 2012). A lack of clarity on the minimum standards for emergency care exists in many developing countries. Many scholars, policymakers, health managers and medical personnel have been unable to reach a consensus on the type and level of EMS that should be freely accessible to everyone (Grady, 2018; Desserud, Veen & Søreide, 2016).

Low utilization of EMS has been reported in countries like Ghana, which has a fairly elaborate EMS system. The low utilization is attributed to lack of knowledge about EMS services with the population not knowing how to contact the EMS systems, and frequent vehicle breakdown (Zakariah et. al., 2017).

1.2.3 Emergency Medical Services in Kenya

Kenya is a lower middle-income country, located in the eastern part of the African continent bordering Tanzania(south), Uganda(west), South Sudan(northwest), Ethiopia(north) Somalia(northeast) and the Indian Ocean Coastline to the eastern side. Kenya is administratively divided into 47 counties following the promulgation of the 2010 constitution (KNBS, 2014). Kenya has a population of over 47 million people (KNBS, 2019).

Access to emergency care services is a fundamental right provided for under Articles 43 (1) and 43(2) of the Constitution of Kenya (2010). Kenya aims to achieve the highest possible health standards; this is part of the country's Health Policy 2014-2030. Some of the aims of this policy are to reduce annual mortalities by 50% and years lived with disability by 25% (Ministry of Health, 2014). Close to 13,000 Kenyans die annually from Road Traffic Accidents (RTAs) and even more from Emergency Medical Diseases (EMDs). Thus, the undisputed need for EMS (WHO, 2012; Daily Nation, 2018).

Under the Constitution of Kenya 2010, Heath Services were devolved, with distinct functions assigned to national and county government. The county governments are responsible for

health services and pharmacies, ambulance services (EMS), promotion of primary health care among others. While the national government is responsible for leadership in health policy development, training, and capacity building (Constitution, 2010).

EMS in Kenya is categorised as underdeveloped due to lack of a national transport policy as well as national policy for trauma care and lack of specialized training in Emergency Medicine. Patient care systems, management systems, speciality systems and academic emergency medicine are requirements for a mature and developing EM System (Arnold, 1991; Ministry of Health, 2014).

Most patients requiring emergency medical services are transferred to hospitals by private means such as cars, taxis, public service vehicles and motorbikes (Wachira & Martin, 2011). EMS providers in Kenya, both public and private, include the Kenya Red Cross Society and St. John Ambulance that operate under wide-ranging health legislation and international guidelines. Various county governments have established EMS system by adopting guidelines from the established providers such as the Kenya Red Cross Society (Ministry of Health, 2014).

1.2.4 Emergency Medical Services in Kisii County, Kenya

Kisii County is one of the 47 counties in Kenya. Kisii is located in the Nyanza region of Kenya, west of Nairobi. The population of Kisii County as per Kenya 2019 census is 1,152, 282 (KNBS, 2019). The county has nine sub-counties with 120 health facilities consisting of 3 level five hospitals, 33 level four hospitals, 53 level three health centres, 91 level two dispensaries, and 126 level one community units (Kisii County Government, 2018).

Upper respiratory tract infections, diarrhoea and malaria are the leading causes of morbidity. While HIV/AIDS, lower respiratory infection and prematurity and low birth weight being the leading causes of mortality (DHIS2, 2018). Kisii County has 1,971 health professionals among these there are 800 nurses, 237 clinical officers, and 135 doctors. Ambulance paramedics are 20 often drawn from the nurses and clinical officers in clinical practice (Kisii County Government, 2018).

At the time health services were devolved, Kenya had not yet established a national EMS system. For this reason, counties had the task of establishing de novo EMS systems in the absence of proper EMS legislation, policies, and guidelines (Kimathi, 2017).

Kisii County Government launched ambulance services in 2013 in partnership with the Kenya Red Cross Society (Kisii.go.ke, 2013). However, the arrangement did not last. Within two years of establishing the partnership, Kisii County decided to acquire and operate its own ambulances, citing cost as the main reason (Kisii.go.ke, 2018). The county purchased 10 ambulances to serve its nine sub-counties. In addition, the county's Integrated Development Plan of 2018-2022 prioritized expanding emergency care by increasing the number hospital with comprehensive EMS from one to 28, and the number of ambulances from 10 to 65 (Kisii County Government, 2018; Kisii.go.ke, 2018).

1.3 Problem Statement

Well designed and implemented emergency medical services (EMS) systems prevent death or disability among acutely ill patients. Countries develop EMS systems to address the most important causes of emergencies (Sawe et al., 2019). Historically, higher income countries tend to have relatively well-established EMS systems, resulting in improved health outcomes. On the other hand, low- and middle-income countries (LMICs) largely have underdeveloped EMS systems (Nielsen et al., 2012). For instance, it is estimated that nearly one third of African countries have EMS systems that serve less than 9% of their population (Mould-Millman et al., 2017).

Most studies assessing EMS systems have been done in urban areas (Brennan, 2006; Shah, 2006; Mehmood et al., 2018). A systematic review of emergency care in Africa found that 87% of the studies focused on hospital-based emergency departments, rather that prehospital emergency medical care, with only 6% from rural areas (Obermeyer et al., 2015). Further, a systematic review of out of hospital EMS by Antony et al (2018) further identifies lack of ambulances as a major barrier to pre-hospital emergency care. Few studies (Jammeh et al., 2011; Zakariah et al., 2017; Mould-Millman et al., 2017; Lee et al., 2018) have examined EMS in LMICs, and of the few, the focus has been primarily on physical access to emergency care, rather than a complete examination of the EMS service continuum.

Kenya has a fragmented and underdeveloped EMS system (Kimathi, 2017). Four years after establishing the county-run systems, no studies have been done to assess the implementation of EMS in Kisii County nor county run EMS systems. This study seeks to examine the experiences, successes, facilitators, and challenges of implementing EMS in Kisii, a rural Kenyan county. As well as provide a holistic health systems assessment of the EMS.

1.4 Research Objectives

This section outlines the objectives of the overall objective and specific objectives.

1.4.1 Overall Objective

To explore facilitators and challenges of implementing EMS in Kisii County using the health system building block framework.

1.4.2 Specific Objectives

1. To explore the facilitators of EMS implementation in Kisii County
2. To explore the challenges of EMS implementation in Kisii County

1.5 Research Questions

i. What facilitators have been experienced in the implementation of EMS?

ii. What challenges have been experienced during the implementation of EMS?

1.6 Scope of the Study

The goal of the study was to explore the current state of EMS in Kisii County, the facilitators and challenges facing EMS services. The study explored these facilitators and challenges across the six health systems building blocks. The study focused on service delivery, health work force, health information system, medical products, vaccines & technologies, health financing systems, and leadership and governance. The target population included both health managers and frontline EMS professionals in Kisii County such as EMS technicians, call-centre personnel, and ambulance drivers. The study was limited to Kisii County Government EMS department under the Ministry of Health. The study was conducted in August 2020.

1.7 Significance of the Study

EMS providers and potential providers will find the findings of this study useful in implementing EMS services. The study provides a comprehensive understanding of all the key components that facilitate an efficient EMS and health system. More precisely, the findings of this study are beneficial to the Kisii County Health Management Team (CHMT). The study provide insight on the EMS service delivery and its operations. The study identifies facilitators

for successful EMS implementation, that can be adopted as good practices and may be implemented in other service delivery departments in the county. The challenges and recommendations identified should prompt the management team to initiate quality improvement plans.

Further, this study findings can be used by policy makers involved in EMS policy formulation. The policy makers can use the study as evidence to guide in formulation of policy goals, implementation strategies, and evaluation of EMS policies. These findings from Kisii County Government EMS provide perspective on EMS uptake and implementation in devolved units.

Researchers and academicians will benefit from the study. The study adds to the body of knowledge in the area of EMS in Kenya and Africa. The study can be used as reference in future related studies.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter is a review of literature on the facilitators and challenges of EMS. Specifically, this chapter will review the theoretical frameworks, empirical reviews, and analytical framework.

2.2 Theoretical Framework

The study will be anchored on Implementation Outcome Framework, the Consolidated Framework for Implementation Research (CFIR) and the Health Systems Building Blocks Framework. These frameworks articulate theoretical constructs and provide a guide for systematic approaches to analysis of implementation outcomes.

2.2.1 Implementation Outcome Framework

Proctor *et all* (2011), proposed that implementation outcomes that are distinct from service outcomes and clinical outcomes in implementation of new treatment, practices, or services. They further define implementation outcomes as the effects of deliberate and purposive actions to implement new treatments or practices. Implementation outcomes identified are acceptability, adoption, appropriateness, feasibility, fidelity, and cost of implementation, penetration, and sustainability. According to Proctor, these implementation outcomes serve as indicators of implementation success or failure as well as intermediate outcomes for service and clinical outcomes (Rosen and Proctor, 1981.) This is so because an intervention or program will not be effective if not well implemented. The service outcomes: safe, effective, patient centred, timely, efficient, and equitable services are derived from the Institute of Medicine's crossing the Quality Chiasm (IoM, 2006). While the clinical outcomes or client outcomes being health status and quality of life.

The framework holds that, the implementation of any treatment or service in health care is recognized as a process involving many stakeholders including the health care workers, health managers, policy makers, patients, and their families. Moreover, the different implementation outcomes are more important at some phases of the process and may also be differently salient to the different stakeholders. For instance, acceptability may be important to the patient, cost may be more important to policy makers and managers, while feasibility may be more

important to front line health workers. Critics argue that these varying levels of applicability does not offer perfect representation of the entire implementation process.

Additionally, critics assert the fact that context of implementation is critical and contextual determinant such as environmental factors are not clearly denoted in this framework. Proctor cites that for validity of implementation outcomes, all stakeholders and priorities should be represented in research. Additionally, researchers suggest that for intervention of programs to be implemented successfully, strategies to improve implementation outcomes need to be employed.

In this study, the EMS is considered the intervention that has been implemented. Although the framework focuses on outcomes of the intervention being implemented, the facilitators and challenges in this study can be used to deduce the success or failure outcomes of the EMS system in Kisii County.

2.2.2 Consolidated Framework for Implementation Research

The Consolidated Framework for Implementation Research (CFIR) describes a menu of constructs associated with effective implementations of interventions. CFIR categorizes these determinants of effective implementation into five domains: intervention characteristics, inner setting, outer setting, individuals involved and the implementation process. CFIR provided a comprehensive and consistent definition of each construct CFIR is used to evaluate interventions or programs in health care setting, by identifying the facilitators and barriers to implementation (Damschroder et al., 2009; Kirk et al., 2016).

Characteristics of the intervention being implemented defines the source of the intervention, adaptability, complexity, cost, quality of design and relative advantage. An intervention or program that is not adaptable in a certain context, is often resisted by people. According to CFIR, the inner and outer environment affects implementation. Inner setting includes organizational culture, hierarchy and structure, communication networks. While outer setting considers external factors such as the macro-economic, political, and socio-cultural context. Individuals involved in the intervention implementation can influence the implementation outcome positively or adversely. People are active recipients of intervention and have the power to experiment, evaluate, challenge, or modify an intervention. Finally, the implementation process from planning, engaging, executing to evaluation is a key component of successful intervention implementation (Damschroder et al., 2009; Keith et al., 2017).

In health care, many interventions have limited impact in the community despite full implementation. CFIR provides a framework to identify facilitators and barriers to successful implementation of programs. While CFIR is largely viewed as a comprehensive framework for assessing implementation, complexity of remains its greatest drawback.

In this study, the determinants of effective implementation were described under different thematic areas. The different EM services offered such as first aid, their quality, and financial model were considered as the intervention characteristics. Inner setting determinants included the human resource working experience, relation with the management, availability of medical products and infrastructure as well as the EMS communication processes. While outer setting determinants included the lead agency and the national regulation, policies, and guidelines. Lastly, individuals involved in EMS included mainly the health work force and the leadership.

2.2.3 Health System Building Blocks Framework

The World Health Organisation (WHO) describe the Health System Six Building Block Framework for the purposes of promoting a common understanding of a health system and what constitutes health system strengthening. These building blocks are based on the functions of a health system. The building blocks are service delivery; health workforce; information; medical products, vaccines and technologies; financing; and leadership and governance (WHO, 2007).

Good quality service delivery encompasses health services that are safe, timely, effective, efficient, and patient centred. A well-functioning health workforce is one that is well-trained, responsive, fair and efficient to achieve the best health outcomes, with available resources. A good health information system provides for reliable and timely production, analysis, dissemination and use of health information. Availability of essential medical products, vaccines and technologies of assured quality and safety is critical too. A good health financing system raises adequate resources to ensure users are protected from catastrophic expenditure and financial impoverishment. Lastly, good leadership and governance provides oversight for all the other building blocks. There is a dynamic relationship between the six building blocks, in that a change in one may influence the other pillars. Conversely the improvement of one pillar cannot happen without the contribution of the other pillars (WHO, 2007).

The six building blocks serve three main functions: to define the desirable attributes of a health system, defining the priorities of a health system, and provide a means to identifying gaps in a

health system (WHO, 2007). The WHO in the World Health Report 2000 identifies the goals of a health system as: improved health, responsiveness, social and financial risk protection and improved efficiency. Other intermediate goals of the health system include access and coverage for effective health interventions, without compromising quality and safety (WHO, 2000).

Critics of the WHO Health Systems Building Blocks Framework argue that the framework is focused on the six building blocks, at the expense of the dynamic processes and goals or outcomes. However, the framework is valuable as a guide for health system strengthening and allocation of resources, Critics further denote that in order to use the framework for research it should be adapted to specific research questions and context (Mounier-Jack et al., 2014; WHO, 2007).

In this study, the Health Systems Building Blocks Framework was employed to understand the implementation and operations of EMS services in Kisii County. The health system building blocks mirror the components of an ideal EMS model i.e. a lead agency, medical direction, communication, transport, infrastructural facilities, human resources, financing, and community support. (WHO 2005; Brennan & Krohmer, 2006). Therefore, the framework is best suited to provide a holistic avenue for analysis with distinct thematic areas for the facilitators and challenges of EMS implementation.

2.3 Empirical Review

2.3.1 Facilitators of Emergency Medical Services Implementation

Haghparast-Bidgoli et al. (2010) evaluated facilitators and barriers to pre-hospital trauma care: an empirical study of the EMS in Iran. The qualitative study explored the perceptions and experiences of health professionals on the factors affecting effective pre-hospital EMS processes for road traffic accident victims. The findings revealed seven categories of factors that facilitate EMS delivery. These included administration and organization, availability and distribution of resources, organizations involved, communication and transportation, infrastructure, lay people involvement, and staff qualification and competences. The findings of this study were similar to a study done by Monk et al. (2003) which showed that human resources, physical resources and organization and administration as critical enablers of an EMS system.

An assessment study done by the WHO (2008) on EMS systems in the European Union found that EMS services are regulated by national laws and public policies. With a majority of the countries having free access to EMS, a standard and uniform minimum standards of care package and publicly finance mechanisms. Moreover, this central regulation is linked to good health systems outcomes such as increased access to EMS, delivery of responsive quality EMS and improved health outcomes. Similarly, an empirical study by Suriyawongpaisal et al. (2014), done in Thailand found that establishment of a national lead agency improved the EMS indicators. Suriyawongpaisal et al. (2014) found that the national lead agency increased coverage by 1.4 times and reduced the total response time by 1.6 times. Cunningham et al. (2010) also asserts that medical oversight and direction is a fundamental component of EMS.

A comparative study assessing three EMS organizations in India and Pakistan, showed that public sector financing is central to the success and long-term sustainability of EMS. The EMS providers assessed were Rescue 1122 in Punjab Province, Pakistan, GVK Emergency Management and Research Institute in Karnataka, India, and Aman Foundation in Karachi, Pakistan. Public financing was shown to allow the population in Pakistan's Punjab Province access EMS at no cost. Therefore, meeting the pro-poor objectives. Although, private sector involvement is seen to meet the pro-poor objective by cross-subsidy models, like is the case with Aman Foundation in Karachi, Pakistan (Sriram et al., 2016).

Rahman et al. (2015) studied EMS key performance measurements in seven Asian cities in six countries (Singapore, South Korea, Taiwan, Japan, Thailand, and Malaysia). The study found that EMS agencies that used electronic patient records provided consistent and sustainable data for performance analysis and improvement. Another study by Adam et al. (2012) that explored the experiences of EMS lead agency leaders with electronic patient records (EMR), found that quality assurance was the main motivator for adopting EMR. Anantharaman and Han (2001) who evaluated to impact of wireless information systems linking ambulanced and emergency department (ED) in Singapore, reported positive communication outcomes. These included, reduced paramedic time at the ED, reduced waiting time for patients in the ED. A study by Plevin (2017) that evaluated the benefits of advanced automated crash notification in the US, showed that AACN reduced response time and mortality following road traffic accidents. Health information systems play a pivotal role in delivery of EMS from computer aided dispatch, EMR for patients, GPS locators (Sriram et al., 2016).

Transportation of acutely ill or injured patients is a key component to EMS. EMS transportation infrastructure ranges from advanced air ambulances, ALS and BLS vehicle ambulances, non-motorized ambulances such as bicycles (WHO, 2005). The study by Sriram et al. (2016), found that a reliable and functional fleet of ambulances ensured efficiency in EMS delivery in Pakistan and India. Srimam et al also, revealed that adherence to a scheduled maintenance for vehicles, reduces breakdowns and keeps the fleet functional. Further, an empirical study in Sierra Leone, looking at transport and communication as facilitators of emergency obstetric care, revealed that increasing the number of ambulances, improved the chances of survival for women with major obstetric emergencies (Samai et al., 1997).

When examining human resources for health, issues of greatest relevance are size, composition, distribution, training needs and flexibility (Kabene et al., 2006). An assessment of the status of pre-hospital care in 13 LMIC by Nielsen et al. (2012) found significant variations in the composition and training qualification. The study found that South Africa and Panama were the only countries with EMS professionals trained in ALS. In Brazil, Mexico, Peru and Maharashtra included doctors, who were required to undergo EMS certification. While Vietnam, Columbia, Ecuador had doctors as EMS providers, but no EMS specific certification was required. Kenya and Pakistan had EMT as EMS providers but did not require any certification. Nielsen et al. (2006) also found that non-EMS first responders such as the police, commercial drivers, firefighters, and lay people received first aid training.

Arreola-Risa et al. (2007) did a study on the cost and effectiveness of providing Emergency Medical Training (EMT) certification to all personnel offering EMS services in Santa Catarina, Mexico. Medics in the EMS department received EMT certification training over a period of 14 month, and Arreola-Risa and colleagues assesses the process and outcomes of trauma care before and after the training. The study revealed that mortality among patients seem by the EMS staff decreased from 1.8% to 0.5 % after the training. Comparable, results were found in Trinidad and Tobago where Ali et al. (1997) assessed the trauma patient outcomes after the Pre-hospital Trauma Life Support (PHTLS) program. Ali et al. found that the mortality of trauma cases reduced from 15.75 to 10.6%. They also report a decrease in length of stay and disability post PHTLS training. Arreola-Risa and colleagues did another study in 2000, to evaluate the treatment improvements post PHTLS. They found that there was an increase in utilization of appropriate intervention for trauma cases. Choi, Blumberg and Williams (2016) further suggest that Continuous Medical Education (CME) on emergency medicine,

conferences and seminars will empower and boost the limited knowledge available on EM amongst health professionals.

The Institute of Medicine's Crossing the Quality Chiasm (Bloom, 2002) introduced six aims of a health care systems or health services These six aims include safe, timely, effective, efficient, equitable, and patient centered services. Many researchers assessing quality of EMS service delivery, focus on response time (Willemain, 1975; McLay, 2010; Mayorga, 2010; Mahama, 2018). According to WHO, the ideal response time is less than eight minutes. Nogueira *et al.* (2016) did a systematic review of the response time of EMS globally. The findings revealed that higher income countries such as USA, UK, Australia, Singapore, and Taiwan reported response times less the 8 minutes, while lower income countries like Ghana and Iran had longer response time.

In summary, the facilitators or EMS implementation include good administration and organization with standard minimum standards, availability and distribution of infrastructure, medical and financial resources, efficient and digital communication modalities, functional ambulances, adequate and well trained huma resource, community involvement, pro-poor publicly financed EMS,

2.3.2 Challenges Facing Emergency Medical Services Implementation

A systematic review by Kironji *et al.* (2018) on barriers of out of hospital emergency care low and low-middle income countries looked peer reviewed literature from January 2005 to March 2015. The review identified six themes or categories of barriers to out of hospital emergency care. These included: cultural barriers, poor or lack of infrastructure, uncoordinated communication, transportation, and equipment and personnel challenges. An empirical study done by Sorani et al. (2018) on challenges of EMS in disaster response in Iran revealed analogous results. Sorani et al. found six themes that included: challenges related to people, challenges related infrastructure, challenges related to staff, challenges related to managerial issues and those related to medical care.

Sriram *et al.* (2016) in their comparative analysis of three EMS organization in India and Pakistan, found out that lack of central regulation and standardization of EMS services lead to a fragmented EMS. The lack of regulation over quality of health care, lead to diffuse responsibility, where the private sector ultimately set their own standards and no one to keep then accountable. Moreover, scholars and policymakers have been unable to reach a consensus

on the type and level of EMS that should be freely accessible to everyone Furthermore, the lack of legislation and public policy has an implication on financing of the model (Sriram et al., 2016).

Nielsen *et al.* (2012) in the qualitative assessment of EMS in 13 LMIC found that inadequate funding was the most common barrier to EMS improvement and expansion. Funding was adversely highlighted despite many of the countries such as Ghana, Pakistan, Sri Lanka, and Panama among other utilizing taxes to fund the EMS. In these countries, patients received the services at no financial cost on their part. Although, the free services excluded non-emergencies or to private facilities. Kenya was the only country where patients had to pay for the services through out of pocket or insurance.

Razzak and Kellermann (2002) in their expert opinion focusing on if EMS in developing countries is worthwhile, published the WHO bulletin highlighted the challenges of a limited budget and shortage of funds have leading to slow progress of EMS in developing countries. Additionally, there are fears among stakeholders and policy makers that investments in EMS may divert resources from other 'mainstream' programs such as curative and preventive medicine. Worth noting, policymakers and even the public in developing countries may fail to support EMS if they are going to limit the funds available for treatment and research.

Sorani *et al.* (2015) studied the prehospital emergency medical services in disaster, in Iran found out that challenges related to health information management system contributed to poor EMS service delivery. Respondents pointed out that the lack of a patient tracking system made it hard to for continuity of care. It took several months for some families to trace their family members. Another challenge was the lack of an integrated hospital information system made coordination of EMS difficult.

Kironi *et al.* (2018) identified poor infrastructure as a significant cause of delay in EMS. Both urban and rural areas in LMIC were affected by either poor road networks or traffic congestion, respectively. In their study, they found out that only less than one percent of the population had access to an ambulance. People who are injured or acutely ill often depend on private or other commercial means of transportation. In some part the only mode of transport are motorbikes. Besides, lack of equipment prevented emergency responders from offering appropriate care to patients. Kobusingye et al. (2005) also noted that the EMS personnel knowledge and skill level did not match the equipment available.

Haghparast-Bidgoli et al. (2010) evaluated facilitators and barriers to pre-hospital trauma care in Iran found that most respondents were concerned with the shortage of professional staff and the inadequate skills on knowledge of staff in EMS. Inadequate and impractical training courses, poor educational plans and insufficient motivation were identified as the main cause of inadequate skills and knowledge among EMS staff. The study also releveled that conflict between ambulance staff and consultant physicians was a common occurrence, leading to mistrust. There were report of mismanagement of emergency cases, which was attributed to the high number of non-emergent dispatches that cause fatigue. A study by Monk et al. done in 2003, that reviewed trauma care for the injured in Ghana and Mexico, had similar findings indicating that the staffing and training of EMS human resource was a weak link in EMS systems.

Sawe *et al.* (2019) conducted a descriptive cross-sectional survey of the Emergency Medicine Residency Programs (EMRPs) in Africa between January 2017 and December 2017. In their survey, they focused on curricula and organization or EMRPs in Africa. At the time only 12 out of 52 African countries had established EMRPs. There findings revealed that EMRPs in Africa offered more exposure to emergency medicine, paediatrics, and obstetrics and gynaecology, with less exposure in toxicology, and neonatal intensive care. This is despite poisoning being a common cause of morbidity and mortality.

According to Kaji, Schriger and Green (2014), the main frameworks for the provision of EMS services in low and middle-income countries are the facility-specific and disease-specific models. There is a shortage of practical models for systematically enhancing the overall provision of EMS in developing countries (Kaji, Schriger & Green, 2014). Despite this, Stein, Wallis and Adetunji (2015) point out that many regions now have EMS programs whose focus is paediatric diseases and emergency maternal conditions. However, there is a myriad of other conditions that will result in acute sicknesses, trauma, and emergencies. Nevertheless, the presence of maternal and paediatric programs may form a platform for the establishment of a more comprehensive, all-conditions approach to Emergency Medicine services (Hansen *et al.*, 2015).

Zachariah et al. (2017) identified additional externalities that hinder the operation of Ghana's National Ambulance Services operationts. These included poor road network and terrain, lack of street names and house numbers, disrespect to sirens by motorists, refusal by health facility to receive emergency cases, inappropriate false alarms, and frequent false alarms. Further, low

utilization of EMS has been reported in countries like Ghana, which has a fairly elaborate EMS system. The low utilization is attributed to lack of knowledge about EMS services, the population not knowing how to contact the EMS systems, frequent vehicle breakdown.

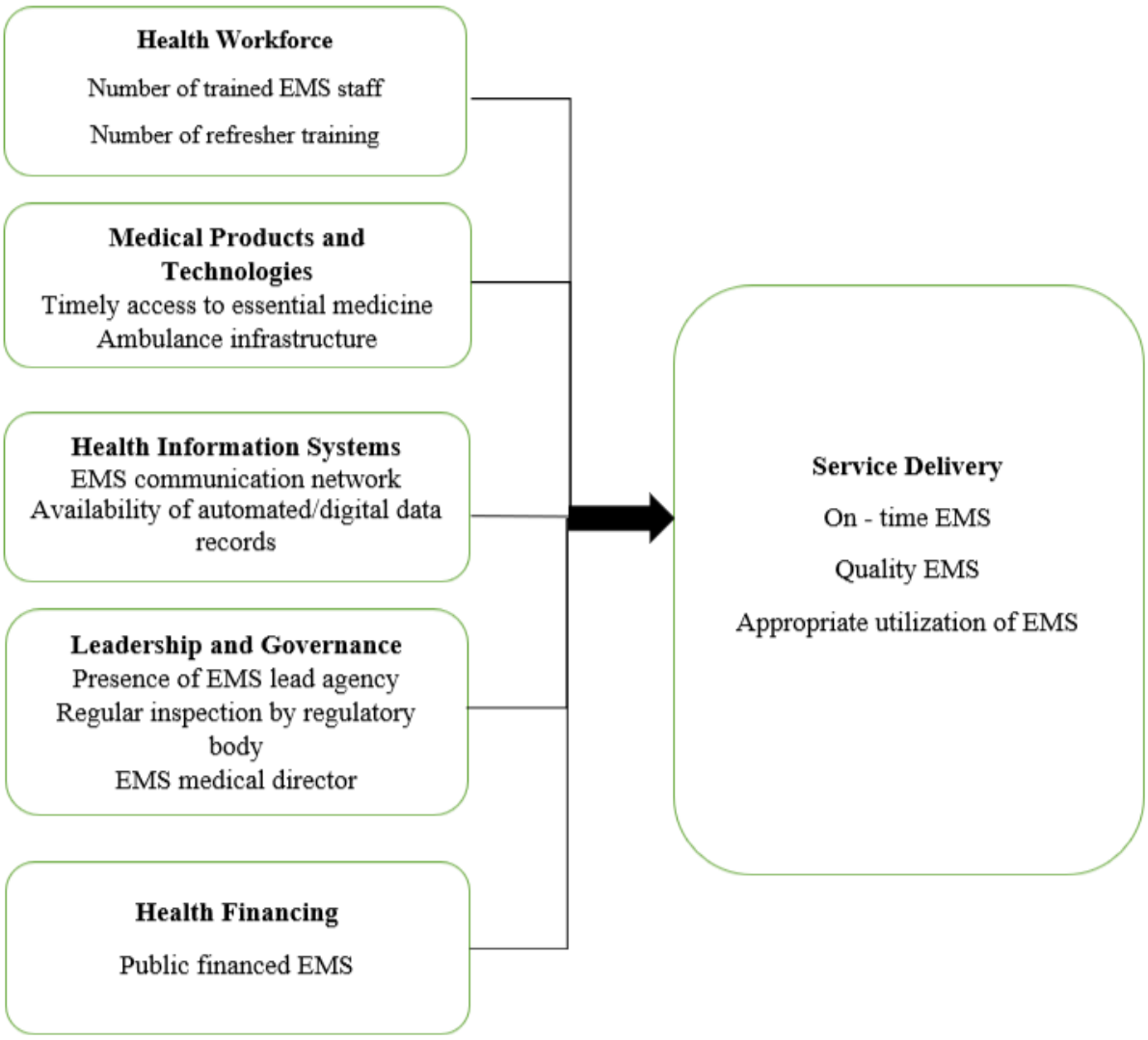
In summary, challenges that hinder implementation of EMS services include lack of central regulation and standardization of EMS, inadequate funding, poor infrastructure and lack of equipment and medical supplies, shortage of professional staff and the inadequate skills on knowledge of staff in EMS, uncoordinated communication and challenges in health information management system.

2.3.3 Summary of Literature Gaps

The empirical studies done relevant to health system facilitators and challenges in the context of EMS are seen to focus on specific diseases and medical conditions or specific health system building blocks. For instance, Haghparast-Bidgoli et al. (2010), Ali et al. (1997), and Samai et al., 1997 are specific to road traffic victims, trauma patients and obstetric emergencies, respectively. While Suriyawongpaisal et al. (2014) and Arreola-Risa et al. (2007) were limited to national lead agencies and EMT training, respectively. The holistic health system view is largely unexplored. This study was conducted to provide this holistic view of EM services, as well as enrich the few studies done in Kenya and Africa.

2.4 Analytical Framework

The research is based on the WHO health system building block, which provides a systematic overview of a responsive health system that provides social and financial protection, improves efficiency and ultimately improves the health of the population. The WHO health system framework consists of 6 building blocks: health work force, health information, medical products and technologies, health financing, leadership and governance and service delivery.



Adopted from the WHO Health Systems Building Block

Figure 2.1: Analytical Framework for EMS Implementation

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers research methodology and discussions of the study research design, study population, sampling technique and sample size, data collection methods, data analysis, research quality and ethical considerations.

3.2 Research Design

The study was a cross-sectional qualitative study that explored the facilitators and challenges of Emergency Medical Services in Kisii County. Kisii County was randomly selected because it is one of the counties to implement county-run EMS system. The research evaluated data on EMS services in Kisii County at a specific time, August 2020. Cross-sectional studies are considered flexible for researchers by providing them with avenues of explore multiple variables together as a constant, with only one variable being the target of the study (Bell, Bryman & Harley, 2018).

3.3 Population and Sampling

3.3.1 Population

The study population of the study were personnel in the Kisii County Emergency Medical Services Department or also known as Ambulance Department. The informants were broadly grouped into managers and frontline professionals. The managers interviewed were ambulance services coordinator, ambulance services director, medical services director and health administrative director. The frontline professionals who participated included the emergency medical technicians, paramedics, ambulance drivers, and call centre operators. According to the Office of the Director of Medical Services the number EMS staff are forty-two.

3.3.2 Sampling

The study utilized purposive sampling technique which is a form of non-probability sampling to settle on the key informants for the study. Purposive sampling was used because of the key informants are best placed to provide information and experiences specific to the EMS. Sutton and Austin (2015) note that non-probability sampling enables a researcher to choose the most

suitable informants for research depending on their availability, accessibility and the operational costs involved.

Guest et al. (2006) recommend that qualitative studies require a minimum of 12 to reach data saturation. Therefore, a sample size of 14 was deemed sufficient given the homogeneity of the population, i.e. staff working the EMS department. The study sought to sample 14 key informants in the EMS department and also included five managers and nine frontline EMS workers. The nine frontline workers were selected to represent of the nine sub-counties, where ambulances are linked to. The participants were selected based on their role as staff in the EMS department, availability on shift and willingness to participate in the study.

3.4 Data Collection Methods

The data collection method employed in this study was in-depth interviews with key informants of the EMS departments in Kisii County. The interviews questions were structured semi-structured to address the six building blocks of a health system. The interviews were audiotaped, and transcriptions done.

Semi-structured interviews with key informants was to offer a face-to-face experience for the researcher, hence developing a relationship; and this led to more openness and reliable data (Drake, Rancilio & Stafford, 2017).

3.5 Data Analysis

The study employed a qualitative thematic content analysis approach where the main activities included data editing, data reduction, and coding. Thereafter, the codes were grouped into specific themes in line with the research objectives. The thematic areas were analysed for pattern and relationships. The information was then interpreted and presented in simple quotes and narrations.

Data reduction, as discussed by Morse (2016), included extracting all relevant information from interview transcripts. The information collected is edited and summarised into segments. Then data coding process involving tagging, labelling and naming critical pieces of data during the analysis and classification of the information into themes, while seeking for patterns and relationships (Morse, 2016).

However, qualitative data analysis is more subjective since it describes variables or parameters from the point of view of the researcher. On the contrary, quantitative research is more objective since it is mostly backed by numerical data and statistics (Bell, Bryman & Harley, 2018). In addition, qualitative data analysis is primarily an inductive process that can result in the generation of new information or the formulation of a hypothesis. In contrast, quantitative data analysis is mostly deductive since it tends to assess pre-specified concepts, hypotheses and constructs that are in existing theories (McCusker & Gunaydin, 2015).

3.6 Research Quality

The objectivity of this research was based on the fact that evidence gathered on the research field, with little regard on personal bias or opinions of the researcher (Drake, Rancilio & Stafford, 2017). Evidence from the interviewee responses in Kisii County was guided by the results of this study. On the other hand, generalizability, a research concept where the results and conclusions drawn from the sample would be linked to the whole population at large and linked also to similar findings (Leung, 2015).

The study pre-tested the interview guide prior to collecting data for the actual study. Pre-testing was done on 3 randomly selected EMS staff in Kisii County. These participants were excluded from the study population. The participants provided their experience and elicited patterns in the facilitators and challenges of the EMS department. There were notable differences in the responses, as participants with a health training background provided more information to some of the questions. This led to a review of the Interview Guide to add probing questions such asking respondents to narrate examples. Pre-testing is crucial as it examines the reliability of the research instrument (Sekeran, 2013).

3.7 Ethical Issues in Research

The researcher obtained ethical clearance from Strathmore University's institutional review broad. A research permit was obtained from NACOSTI. Further, permission for the study was sought and granted by the Kisii Teaching and Referral Hospital (KTRH) and Kisii County Ambulance Department. Voluntary consent was obtained from key informants to willingly participate in study. The respondents were assured of confidentiality and anonymity.

Ethics is an important in any research as it enhances the values needed for collaborative work; that include fairness and mutual respect (Patten & Newhart, 2017). Ethical behaviour assisted

in ensuring that the researcher does not commit errors in the pursuit of knowledge and the truth. Hence, the researcher ensured that there were minimum confrontations with regulatory and legal bodies involved in research methods.

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION, AND INTERPRETATION

4.1 Introduction

This chapter entails data analysis, presentation, and interpretation of the study findings. Specifically, this chapter will cover the response rate, respondents' general information, and the findings based on the study objectives. The study collected qualitative data through key informant interviews. The findings have been structured along with the major themes in line with the research objectives.

4.2 Response Rate

The researcher sought to interview 14 respondents: five managers, and nine frontline EMS workers. A total of 13 respondents were interviewed for this study. This translated to 92% of respondents that participated in the study. One targeted respondent was not available due to a busy schedule that involved frequent field activities during the period of data collection. It was not possible to get a virtual/telephone interview, neither could we get a replacement because all the respondents with comparable managerial experience and information had been interviewed. According to *Mugenda and Mugenda* (2013), 70% response rate is excellent, 60% rate is good and 50% adequate for analysis and reporting. Face to face administration and prior booking and scheduling of key informant interviews contributed highly to the 92% study response rate. Additionally, 13 respondents were within the recommended minimum sample size of 12 for qualitative research (Guest et al., 2006).

4.3 Respondents General Information

The study sought to determine the general information of the respondents. The data sought included their educational background, length of experience, gender, and their role int the EMS department.

4.3.1 Respondents' educational backgrounds

The study participants were four nurses, four drivers, two clinical officers, two administrators and one medical officer.

4.3.2 Length of experience

Out of the 13 respondents that participated in the study,10 had worked for the department of health of Kisii in a range of 2-5 years and three participants for over 10 years.

4.3.3 Gender

Out of the 13 respondents that were interviewed three were female and ten were male.

4.3.4 Role in EMS Department

From the interviews conducted, three respondents were senior managers, while ten were frontline workers. Out of the 10 frontline workers respondents, two were middle level supervisors of the EMS department.

4.4 Facilitators of Emergency Medical Services Implementation

In addressing this objective, the researcher asked respondents about the facilitators of the EMS implementation. The questions were structured to provide insight into each of the building blocks of a health system. The answers stemming from the thematic analysis are presented in various sections.

4.4.1 Service Delivery

The researcher sought to find out the kind of services offered by the EMS department; the responses elicited six open codes for emergency medical services offered. These included evacuations, referrals, responding to emergencies, health education, and first aid services. Six respondents indicated that referrals of emergency cases as the major services they offered with and outside Kisii County, while medical evacuations (4), responding to other emergencies (3), offering first aid services (2) health education (1), and improving the health of the general public (1) respectively.

One respondent stated,

> "*Nearly 90% of calls that we receive from the dispatch office are mainly for referrals from government facilities within the county."*

Another respondent added,

> *"We offer mainly emergency services, and sometimes we transfer non-emergency cases such as cancer patients who cannot use normal transportation. We also can offer first aid services on site for example, first aid to a diabetic patient who has collapsed in a market or meeting."*

Further, the majority of the respondents (10) stated that EMS services have been of importance to the Kisii County resident by responding timely to emergencies once requested, while the remaining respondents illustrated that EMS services responded to community needs, assist needy family (cushion them from paying within the county).

One respondent described the departmental quality improvement mechanisms,

> *"We conduct departmental review meetings. We analyze cases for instance near deaths or near misses. Then we put in measures to handle the next patient better. We also use the 'Golden Hour Rule,' that is vital for emergency cases such as cardiac patients. We also do inhouse Continuous Medical Education."*

When respondents were asked about the successes associated with EMS services, all highlighted various emergency services provided. Out of 13 respondents to the study, eight of the respondents articulated that EMS services have been a success by reduced mortalities by saving lives of clients that needed the services most. The remaining respondent illustrated that EMS services have been a success in responding to emergencies within the county.

One respondent stated,

> *"The sole purpose of EMS is to save lives because we come in when there is an emergency. We've had so many successes where we have saved the life of a patient from one referral from one point to another and first aid at the scene."*

The researcher further investigated what facilitated the EMS implementation success. All the 13 respondents enlisted staff dedication as a major facilitator, while eight attributed the success to teamwork, two mentioned support from management and one recognized the financing model as a facilitator.

4.4.2 Human Resource

All the 13 respondents revealed that there was diversity in the EMS department in terms of educational background, work experience, gender, and ethnicity. One respondent indicated that although the number of staff is not adequate, all staff in EMS have basic training in emergency care and that their skills are adequate for the job.

One respondent stated,

> *"In terms of diversity of education background, we have a pharmaceutical technologist, clinical officer, and a nurse…there is also diversity in gender."*

Another respondent said,

> *"The skills are adequate, but we need training especially, on the job training and refresher training on EMS services because medicine is improving and there is a lot of advancement."*

4.4.3 Health Information System

Out of the 13 respondents, nine respondents detailed that the department had various health information system tools and further indicating that a mobile phone is their main communication tool. All the participants that were interviewed could describe the EMS dispatch communication process.

One respondent explained,

> *"The calling facility calls the dispatch office and requests for an ambulance and state the client's complication and request for an ambulance. The dispatcher records the request then calls the nearest ambulance located within the requested location and dispatches a team to the facility with the same information that was provided at by the calling facility."*

Another respondent added,

> "*As dispatchers at the EMS department this process has eased the referral system within the department. Once the call is made by the referring facility we assess the cases quickly*

to determine if truly it is a referral cases and if it can be handled within the sub-county or at our Kisii Teaching and referral Hospital."

All the 13 respondents stated that the documentation of patient information is done manually on a Patient Care Report (PCR) booklet. Information recorded include patient details, caller's details, various dates and times of various processes, EMS team dispatch, among others.

One responded stated,

"*We have booklets that they use where they register if someone calls, the time and the time the vehicle reached there. We have category of recording; once a call comes it is recorded and once a vehicle is dispatched it is recorded. Right now, all this is manual."*

Another respondent added,

"*The dispatcher fills the PCR booklet and then conveys the information to the standby paramedic to take note of the case. The important of filling the PCR is that it assists in informing paramedic the state of the patient and also informs us on the department workload."*

4.4.4 Medical Products, Technologies, and Infrastructure

When the participants were asked to identify the available infrastructures within the EMS department, the following codes were elicited: ambulances, offices, office supplies, ICT infrastructure, ventilators, oxygen apparatus etc.

10 respondents stated that they received basic medical supplies such as gloves and medicines from the county health depot and the Kisii Teaching and Referral Hospital on request.

One respondent said,

"*All the ambulances in Kisii County are Basic Life Support ambulances. They are fitted with patient monitors, suction machines, oxygen cylinders, BP machines among others. We are also supplied with medication and supplies like oxytocin and normal saline"*

One respondent said,

"The medical supplies are there for example, gloves, medicine and equipment in the ambulances with minimal stock outs. I have never seen a time when my staffs say they have run short of these supplies because most of the time they are there."

One respondent appreciated the management for providing medical supplies,

"My take on medical supplies is to say thank you to whoever is responsible. When we need supplies, we only make orders and if they are available, we get them. Like oxygen, we just refill at KTRH, other supplies we order from the main store. Sometime some supplies are not available but mostly we get the majority of them."

Another respondent recounted an incidence where they had a critical patient and had the required medical supplies,

"There is one case when I joined the team, I had the patient referring to another facility. The patient had post-partum hemorrhage I needed to do something because the patient was bleeding uncontrollably so I had to do something en route to KTRH. Everything I wanted was in the ambulance like I was doing balloon catheterization and I did not expect to have IV set, condom, IV fluid and it was successful. When we delivered the patient to KTRH was stable. The experience was good."

4.4.5 Health Financing

The researcher sought to determine how the EMS department is financed, the budgeting process and utilization of resources. Seven respondents elaborated that the EMS department is financed through Kisii County Government's Health Department budgetary allocation.

A senior manager highlighted that,

"*Our department receives support through the county government budgeting process. We are usually considered during the budgeting process though there usually challenges here and there in accessing the funds.*"

Additionally, 12 of the study respondents indicated that ambulance user within the county of Kisii are not charged any fee for the service. However, those requiring services outside the county pay

for the service. The monies collected from the inter-county transfers are mostly utilized to reimburse the EMS staff allowances.

One of the health managers said,

> "*As a county through the leadership of His Excellency Governor Ongwae we do not charge our residents for any services offered within the county, but we charge them when they sought for services outside the county. This model has greatly reduced the economic burden of the affected households and we are really humbled by the governors' generosity."*

Similarly, another respondent added,

> "*The department acquired a finance model of not charging any client seeking services within the county, but we charge clients for services they seek outside the county. The small fee charged caters for the paramedics and the ambulance operators' night outs and maintenance of ambulances."*

4.4.6 Leadership and Governance

The study sought to find out the leadership and governance structure of EMS department as well as existing overarching lead agencies: national or county regulatory bodies, as well as laws, policies, and guidelines in place.

Three managers respondents indicated that Kisii County has an EMS policy that forms the basis of establishing the department and budgetary allocation.

One of the managers stated,

> *"…CHMT developed a policy document that was even tabled at the county assembly for discussion. We developed a policy document that has provided a legal framework for the EMS operation. This has provided standard for the service delivery."*

Although other respondents were not privy to the policies in place, they indicated that their practice is guided by other professional code of conduct guidelines.

Some respondents indicated that the EMS department is supported well through budgetary allocation and availability of medical supplies.

One respondent appreciated the management for providing medical supplies,

> *"My take on medical supplies is to say thank you to whoever is responsible. When we need supplies, we only make orders and if they are available, we get them. Like oxygen, we just refill at KTRH, other supplies we order from the main store. Sometime some supplies are not available but mostly we get the majority of them."*

4.4.7 Summary of Facilitators of Emergency Medical Services Implementation

The study established that the main services offered by the Kisii County EMS are referral of patients between facilities and medical evacuation. The study also established that the main success for the EMS department is reducing mortalities in the county. These successful outcomes of EMS delivery are largely attributed to the dedication and teamwork among the staff.

The study further established that the facilitators of EMS implementation and service delivery included a diverse and inclusive human resource, availability of basic communication and health information systems, adequate medical supplies, and public financing through County Government budgetary allocation.

4.5 Challenges Facing Emergency Medical Services Implementation

In addressing this objective, the researcher asked respondents about the challenges of the EMS implementation. The questions were structured to provide insight into each of the building blocks of a health system. Respondents highlighted various challenges affecting EMS service delivery.

4.5.1 Health Workforce

All of the respondents illustrated that the EMS health workforce is not adequate in terms of numbers and skills.

Respondents stated,

"The EMS staffing is not adequate as per the required staffing norms, this has resulted in EMS services not offering adequate and required services once called upon. This also strained EMS staffs due to the tight duty roster and assignments assigned to them."

Another respondent stated,

"In terms of experience, I feel like it is not sufficient, since some of the paramedics and ambulatory operators attached to the EMS department have not received adequate training on basic EMS."

10 of the respondents had an educational background in healthcare, while three did not have an educational background in health. All the managers had educational background in health.

Out of the 13 respondents only one respondent had prior training and certification in Emergency Medical Services. Out of the nine EMS frontline respondents in the study, four received emergency medical technician (EMT) certificate training supported by the county government during the inception of EMS, two sponsored for their emergency medical technician certificate training, and three do not have basic EMT training but did on-job-training.

One responded stated,

"*I was there during the EMS inception and I was involved in each and every stage. The paramedics and ambulance operators that were deployed to the department received basic trainings on EMS services that was organized by the county government. But since then we have not received any form of support in EMS training and the field requires refresher trainings."*

Another respondent added,

"*When we joined the EMS department, we thought we could be oriented and taken to a basic training to improve our emergency medical training. We only have what we were trained at the college and we lacked experienced on emergency medical services, but the experienced colleagues have really been helpful."*

Six of the respondents recommended the need for staff motivation through timely payment of allowances, promotion, provision of housing and training.

4.5.2 Medical Products and Technology and Infrastructure

Eleven respondents highlighted ambulance and equipment maintenance as a challenge to service delivery. Eight respondents identified lack or inadequate fueling as frequent challenge in the department. The delays in fueling and maintenance were attributed to low budgets or slow bureaucratic process.

One respondent stated,

> *"We have a few but critical challenges such as, fuel rationing. How do you fuel 30-50 Liters for an ambulance, that get exhausted after two responses due to the long distance covered? Then the process of fueling is long and sometimes takes the whole day. In the meantime, patients keep calling and you cannot respond due to lack of fuel."*

Another respondent added,

> *"Sometimes the servicing of vehicles is not done on time. Vehicles can be packed for a week due to lack of service. There are a few days the EMS are grounded due to mechanical issues, no fuel, and non-payment of allowances."*

One respondent stated,

> "*On EMS infrastructure we are not doing badly. But there is definitely room for improvement. We can improve the maintenance of the patient compartment to reach the original standards"*

4.5.3 Health Information System

When the researcher sought to find out about health information challenges, nine respondents stated that although the department had various information system equipment such as a phone, GPS locators, radio callas, and computers, most of the equipment has malfunctioned. This had led to a breakdown in communication and service delivery efficiency.

One respondent said,

> "*Yes, we have ICT infrastructure systems but they are faulty, the only functioning ICT infrastructure is a mobile phone, the other ICT infrastructures such as GPS locators, radio calls and computers have broken down and are yet to be repaired."*

Another respondent explained,

> "*We used to have proper functioning ICT infrastructure but all of them broke down. Like in our radio call broke down when the doctor plaza building construction began, they dropped our aerial radio call tower and our GPS locator. Since then we have been having challenges in communication. We rely on mobile phone that at times are not reliable and the ambulance operators at times tend to lie where they are located."*

Additionally, all the 13 respondents stated that the documentation of information is done manually on a Patient Care Report (PCR) booklet. One manager highlighted that there is no reporting protocol of their activities to the central Ministry of Health since there is reporting tool and as a result the data from the EMS department is not captured in the national Kenya Health Information System(KHIS).

One respondent said,

> "*Our department and staff work tirelessly to provide EMS services to Kisii resident but the workload is not captured by any MoH tool that can be later be upload on various platforms such as DHIS that informs a lot of decision making and funding. We highly recommend that a tool be developed to capture EMS activities and workload.*"

4.5.4 Health Care Financing

On health care financing some respondents indicated that they are not involved in the financial management and decision making, resulting in lack of transparency in the utilization of EMS resources.

One responded stated,

"*As healthcare providers at the department we feel neglected and isolated on how our funds are budgeted and utilized. We just hear that we are allocated funds, but we have never seen where the monies go to and how they are spent. This show that there is no transparency and prioritization of EMS funds."*

4.5.5 Leadership and Governance

The study sought to find out the leadership and governance structure of EMS department as well as existing overarching lead agencies: national or county regulatory bodies, as well as laws, policies and guidelines in place.

All the respondents stated that they have never had any interaction with an EMS regulatory agency in their line of work. No specific EMS licensing is required for their practice. Although the ambulance vehicles get inspected and licensed for road safety purposes.

One respondent stated,

"*I do not know of any EMS regulatory body and I have never engaged with any. I only take my ambulance for the NTSA inspection only."*

62 % (8) of the respondents were not aware of any EMS policies in place.

One respondent said,

"*As for me I do not have any idea if there are any EMS policies in place. We only use our thoughts to execute our work. We have never been enlightened if these policies are in place. We need to lobby the county to develop robust policy guidelines that are going to ensure there are standard procedures in service delivery in the county."*

While 10 respondents felt that they were not adequately supported by their leadership in regard to capacity building, equipment maintenance, or involvement in decision making.

One respondent said,

"*The EMS department is always left out by the county top leadership and even by our very own CHMT. They do not follow up on EMS funds, no capacity building has been offered*

so far to the new recruits, poor communication from our leaders, no organogram, no political goodwill to in support the growth of EMS department.

4.5.6 Summary Challenges Facing Emergency Medical Services Implementation and Service Delivery

The study established that the main challenge facing the EMS department is under staffing and inadequate EMS training and certification. Other challenges included manual health records and faulty electronic communication equipment such as the GPS locator. The EMS department relies mostly on a mobile phone for communication. Despite the EMS being government funded, the study established that there are issues of late disbursement of funds and perceived lack of accountability. The frontline EMS staff reported not being involved in the departmental budgeting process.

The study underscored the fact that there is no EMS regulatory agency/lead agency at national or county level. Further, most respondents were not aware of any EMS policies. On leadership, the study established that there were gaps in support from management in addressing the EMS department needs such as training, maintenance of infrastructure and involvement in decision making.

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter interprets and presents the key findings, conclusion drawn, and recommendation made in line with the study objectives.

5.2 Discussion

5.2.1 Facilitators Emergency Medical Services Implementation

The first objective of the study was to explore the facilitators of EMS implementation in Kisii County. The study revealed that the EMS greatly improved health outcomes of the population by decreasing mortality rates especially maternal and infant mortality. Further, EMS services provided timely response to medical emergencies and evacuation. This is in agreement with studies that have were conducted in Burundi and South African that had recorded a tremendous reduction in maternal mortality rates as a result of having an effective functional EMS system (Tayler-Smith *et al.*,2013). The study further concurs with the findings of Mowafi *et al*., 2013 and Papali *et al.,* 2015 that described the importance of minimizing the 3 delays model of maternity mortality considering obstetrics is second contributor of diseases reported in pre-hospital.

The study explored the factors that enabled service delivery successes and found that health workforce is a major facilitator of EMS delivery. The respondents indicated that there was diversity in terms of educational background, with a majority of the staff being nurses, drivers and clinical officers. The study found out that the few EMS staff had EMT certification, while some do not have EMT training certification, but received on-job-training. The County Government had supported one certificate training at the inception of EMS services. It is therefore not a requirement to have EMT certification to work in the Kisii County EMS

department. These findings are similar to the findings of a study by Nielsen *et al.* (2013) found significant variations in composition and training qualification in 13 LMIC. In their findings, some countries like Brazil, Peru and Mexico required EMS certification, while this was not a requirement in Kenya and Pakistan. Another study by Mould-Millman *et al*. (2017) in Africa also found that that majority of the countries utilized nurses as EMS providers, and some countries had emergency medical technicians, and EMS physicians. Although this study did not compare health outcomes linked to EMS specific training, it can be inferred from the findings of Arreola-Risa *et al*. (2007) that pre-hospital health outcomes improve when patients are handled by trained EMS providers. A comparable study by Ali *et al.* (1997). found that the mortality of trauma cases reduced from 15.75 to 10.6%. they also report a decrease in length of stay and disability post Pre-hospital Trauma Life Support training.

The study determined that dedicated staffs and teamwork were prioritized as the contributors of EMS success. Unlike a study by Haghparast-Bidgoli *et al.* (2010) that revealed there was conflict between ambulance staff and consultant physicians was a common occurrence, leading to mistrust and poor working environment. It maybe be expected that diversity in a team could lead to conflict, this study revealed that synergy is possible diverse teams.

This study found out that communication is a key component of the EMS. Kisii County EMS have a mobile phone that is used to coordinate the dispatch process. There is a network of communication between the caller/referring facility, referral facilities, dispatch team and EMS providers. The respondents seem to be satisfied with the communication protocol and co-ordination that results in timely responses. Details of the pre-hospital care are also well documented including patient data and the response time. A study by Anantharaman and Han (2001) who evaluated to impact of wireless information systems linking ambulanced and emergency department (ED) in Singapore, reported positive communication outcome such as

reduced waiting time for patients. This study found that although the documentation is manual, the record can still be used for audits and quality improvement. On the contrary, a study by Rahman *et al.* (2015) studied EMS key performance measurements, found that EMS agencies that used electronic patient records provided consistent and sustainable data for performance analysis and improvement. The manual recording in this study may seem efficient at the moment because the department is relatively newer and rarely require data retrieval or reference to data. Additionally, there is no national reporting available for EMS, these would necessitate some digital records.

The study also found out that availability of infrastructure and medical supplies as a major contributor to EMS in Kisii County. The respondents appreciated the fact that medical supplies like oxygen and gloves were readily available as needed. Further noting there are positive lifesaving experiences associated with availability of medical products and supplies. This concurs with a study by Monk *et al.* (2003) that showed physical resources such equipment, medical supplies and infrastructure are critical in reducing mortality and disability in the emergency medical care of an injured patient.

This study also established that the Kisii County EMS are largely government funded through the county government budgetary allocation. All patients requiring EMS services within the county do not pay for the services. This in concurrence with finding by Sriram *et al*. (2016) that also highlighted that public sector financing is central to the success and long-term sustainability of EMS in India and Pakistan. They further explain that when there is no cost passed to the user, the system meets the pro-poor objectives and increases equity.

5.2.2 Challenges of Emergency Medical Services Implementation

The second objective of the study was to explore the challenges of EMS implementation in Kisii County. The study established that the EMS department faced some challenges in its

implementation. The main challenges included staff shortage and long working hours, dysfunctional infrastructure and equipment and poor leadership. This challenges are similar to those found in a study by Sorani *et al.* (2018) on challenges of EMS in disaster response in Iran revealed analogous results. Sorani *et al.* (2018) found six themes that included: challenges related to people, challenges related infrastructure, challenges related to staff, challenges related to managerial issues and those related to medical care.

The study revealed that respondents especially the frontline workers reported that the staffing was not optimal, ad this resulted in long working schedules. Additionally, the study found out that the EMS staff did not receive adequate EMT specific training and that no additional training has been offered by the Kisii County since the inception of EMT. The study found that those who did not receive EMT training relied on on-job-training for knowledge and skills. This suggests that the knowledge and skills of EMS provider is inadequate. These findings are similar to a study by Haghparast-Bidgoli *et al.* (2010) that found that most respondents were concerned with the shortage of professional staff and the inadequate skills on knowledge of staff in EMS. Similarly, another study by Monk et al. (2003) revealed that staffing and training of EMS human resource was a weak link in EMS and trauma care. EMS training and continuous medical education has been shown to improve health outcomes (Ali *et al*., 1997; Sawe *et al*., 2019)

On Health Information System, the study found out that some communication equipment such as the GPS locator and radio call and computers had malfunctioned and yet to be repaired. This makes it difficult to verify the location of an ambulance and EMS provider. A study by Plevin, (2017) found that effective use of communication systems in EMS reduces response time and mortality following road traffic accidents in the United States. Similarly, a study done in Sierra Leone by Samai & Sengeh, (1997) revealed that the purchase of ambulances and enhancement

of communication systems resulted in a 50% reduction of case fatalities and the utilization of EMS-based obstetric services doubled. It is therefore imperative that communication equipment is fully functional all times for efficient EMS delivery.

The study also found out that the Kisii County EMS department kept manual records and prepared summary regular reports, but they did not have a national reporting protocol. The Kenya Health Information System (formally known has the District Health Information System-DHIS) does not include reporting tools and guidelines for EMS. This is an indication that no data is collected by the Ministry of Health on EMS nationally. This is so because the time of conducting this study there was no national EMS policy nor a lead agency on EMS in Kenya (Kimathi, 2017; Wachira & Martin, 2011). According to Sriram *et al.* (2016), lack of regulation over quality of health care, lead to diffuse responsibility, where the private sector ultimately set their own standards and no one to keep then accountable. In this regard the study revealed that Kisii County had developed its own EMS policy that guided the implementation. The WHO (2008) recommend that national polies and Regulation that define a standard and minimum standard care package are linked to a responsive and quality EMS delivery.

The study also found an information gap in financial management. Many frontline workers were not involved in the departmental budgeting and expenditure process. As such, there were reported challenges regarding lack of maintenance of ambulances and other faulty equipment, delay in reimbursement of allowances to EMS providers, and occasional delays in budgetary allocation. the study found out that there was no transparency in the EMS financing. These finding corelate with a study by Plevin (2017) who found out that sufficient funding ensures the EMS system can procure and repair infrastructure where necessary. This study further reveals that in as much as the EMS system is publicly funded, if the funding is not sufficient or delayed, there are negative implications on service delivery.

5.3 Study Limitations

The main limitation of the study was the small sample size of 13 out of a study population of 42. This study population is even smaller in relation to the population of Kisii County Therefore, findings of the study may not sufficiently reflect on the county run EMS systems. To overcome this, the study picked a sample of the population with a better in-depth knowledge of the EMS in Kisii County.

Another limitation concerns the utilisation a qualitative study design and face-to-face interviews as the mode of data collection. This in person interviews present a bias in that, the respondents may only provide information that is perceived acceptable. To minimise this risk the study assured the respondents of confidentiality. This limitation can be addressed in future studies that used quantitative study methods to augment the findings.

5.4 Conclusion

The study concludes that in Kisii County, EMS have contributed to improved health outcomes, particularly reduction of mortality and morbidity. The first objective was to explore the successes of EMS implementation in Kisii County. The study established that the EMS implementation has improved health services by increasing the scope of services to include referrals, medical evacuation, health education and first aid services. These services have reduced mortality and morbidity. The main facilitators for the EMS service delivery include a dedicated, diverse and team spirited work force, good communication and coordination during the dispatch process, availability of infrastructure, medical products, and technologies, and publicly financed system.

The second objective of the study was to explore the challenges of EMS implementation in Kisii County. The finding revealed that the main challenges in the EMS implementation are inadequately trained workforce, staff shortages, long working hours, some faulty equipment,

lack of financial transparency and delays in allocation, lack of a lead agency and national policies on EMS.

5.5 Recommendations

The study found that the EMS experienced challenges in the human resource numbers as well as training. The study therefore recommends to the Kisii County Government to ensure increase the number of EMS staff and provide EMT certification training and regular refresher training to increase the knowledge and skills of the staff. The study also recommends timely disbursement of EMS department funds from the County Treasury. This will reduce the incidences of lack of fuel or delayed ambulance and equipment maintenance. Further, the county should procure or repair faulty equipment such as the GPS locator. The study also urges the Kisii County government to adopt a digital health management and information system. For patient records, communication, and location ambulances.

The study established gaps in the national lead agency gaps in regulation and policies. The study recommends that the national Ministry of Health establishes an EMS regulatory body that provides standards for EMS operations in the county. The Ministry should also develop a policy on Emergency Medical Services in Kenya, include EMS reporting on Kenya Health Information System and build capacity in EMS trough specialization training.

5. 6 Suggestions for Further Studies

The general objective of the study was to explore facilitators and challenges of implementing EMS in Kisii County, from the perspective of managers and frontline EMS providers. The study recommends expansion of the scope to include the perspective of the patients or users of

EMS. It is also suggested that future studies explore these facilitators and challenges across counties and other private EMS services in Kenya to establish any patterns.

REFERENCES

Ali, J., Adam, R. U., Gana, T. J., & Williams, J. I. (1997). Trauma patient outcome after the Prehospital Trauma Life Support program. *Journal of Trauma and Acute Care Surgery*, *42*(6), 1018-1022.

Al-Shaqsi, S. Z. K. (2010). Response time as a sole performance indicator in EMS: Pitfalls and solutions. *Open access emergency medicine: OAEM*, *2*, 1.

Arnold, J. L. (1999). International emergency medicine and the recent development of emergency medicine worldwide. *Annals of emergency medicine*, *33*(1), 97-103.

Arreola-Risa, C., Vargas, J., Contreras, I., & Mock, C. (2007). Effect of emergency medical technician certification for all prehospital personnel in a Latin American city. *Journal of Trauma and Acute Care Surgery*, *63*(4), 914-919.

Aytac, S., & Akalp, M. S. G. (2017). The Attribution Theory of As a Psycho-Social Approach to the Perception of Occupational Health and Safety: A Focus Group Study Among Women Workers in Metal Industry. *European Journal of Multidisciplinary Studies*, *2*(5), 355-362.

Azuma, K., & Ohta, S. (2016). Relations with emergency medical care and primary care doctor, home health care. *Nihon rinsho. Japanese journal of clinical medicine*, *74*(2), 203-214.

Bell, E., Bryman, A., & Harley, B. (2018). *Business research methods*. Oxford: Oxford university press.

Blanchard, I. E., Doig, C. J., Hagel, B. E., Anton, A. R., Zygun, D. A., Kortbeek, J. B., ... & Innes, G. D. (2012). Emergency medical services response time and mortality in an urban setting. *Prehospital Emergency Care*, *16*(1), 142-151.

Bloom, B. (2002). Crossing the quality chasm: a new health system for the 21st century. *JAMA: The Journal of the American Medical Association*, *287*(5), 646-647.

Brennan, J. A., & Krohmer, J. R. (Eds.). (2006). *Principles of EMS systems*. Jones & Bartlett Learning.

Brown, A. F., & Cadogan, M. (2018). *Emergency Medicine: Diagnosis and Management*. Florida: CRC Press.

Birkinshaw, J., Holm, U., Thilenius, P., & Arvidsson, N. (2000). Consequences of perception gaps in the headquarters–subsidiary relationship. *International Business Review*, *9*(3), 321-344.

Burkholder, T. W., & King, R. A. (2016). Emergency physicians as Good Samaritans: survey of frequency, locations, supplies and medications. *Western Journal of Emergency Medicine*, *17*(1), 15.

Byrne, M., & Tickle, M. (2019). Conceptualising a framework for improving quality in primary dental care. *British dental journal*, *227*(10), 865-868.

Cappell, M. S. (2017). *Principles and practice of hospital medicine*. New York: McGraw-Hill Education Medical.

Chang, C. Y., Abujaber, S., Reynolds, T. A., Camargo, C. A., & Obermeyer, Z. (2016). Burden of emergency conditions and emergency care usage: new estimates from 40 countries. *Emerg Med J*, *33*(11), 794-800.

Choi, B. Y., Blumberg, C., & Williams, K. (2016). Mobile integrated health care and community paramedicine: an emerging emergency medical services concept. *Annals of emergency medicine*, *67*(3), 361-366.

Choo, C. W. (2002). *Information management for the intelligent organization: the art of scanning the environment*. Information Today, Inc.

Constitution (2010). The Kenyan Constitution. [Internet Retrieved 25 December 2019. Available from: http://www.kenyalaw.org:8181/exist/kenyalex/sublegview.xql?subleg=Const2010

Cottrell, E. K., O'Brien, K., Curry, M., Meckler, G. D., Engle, P. P., Jui, J., ... & Guise, J. M. (2014). Understanding safety in prehospital emergency medical services for children. *Prehospital Emergency Care*, *18*(3), 350-358.

Counselman, F. L., Babu, K., Edens, M. A., Gorgas, D. L., Hobgood, C., Marco, C. A., ... & Beeson, M. S. (2017). The 2016 model of the clinical practice of emergency medicine. *Journal of Emergency Medicine*, *52*(6), 846-849.

Couper, I., Ray, S., Blaauw, D., Ng'wena, G., Muchiri, L., Oyungu, E. & Conco, D. (2018). Curriculum and training needs of mid-level health workers in Africa: a situational review from Kenya, Nigeria, South Africa and Uganda. *BMC health services research*, *18*(1), 553.

Coyle, R. M., & Harrison, H. L. (2015). Emergency care capacity in Freetown, Sierra Leone: a service evaluation. *BMC emergency medicine*, *15*(1), 2.

Cunningham, C. A., Wesley, K., Peterson, T. D., Alcorta, R., Kupas, D. F., Nelson, J. A., ... & Upchurch, J. (2010). The role of state medical direction in the comprehensive emergency medical services system: a resource document. *Prehospital Emergency Care*, *14*(3), 404-411.

Daily Nation (2018). Retrieved 25 December 2019, Available from: https://www.nation.co.ke/news/Kenya-road-deaths-grossly-underreported--WHO/1056-4893792-ve7d07z/index.html

Desserud, K. F., Veen, T., & Søreide, K. (2016). Emergency general surgery in the geriatric patient. *British Journal of Surgery*, *103*(2), e52-e61.

Drake, B. F., Rancilio, D. M., & Stafford, J. D. (2017). Research methods. In *Public Health Research Methods for Partnerships and Practice* (pp. 174-187). Abingdon: Routledge.

Durgun, H., & Kaya, H. (2018). The attitudes of emergency department nurses towards patient safety. *International emergency nursing*, *40*, 29-32.

Ervin, D. A., & Rubin, I. L. (2016). Assessing Health and Quality of Care. In *Health Care for People with Intellectual and Developmental Disabilities across the Lifespan* (pp. 1913-1918). London: Springer.

Fullagar C.J., Prasad N.H., Brown L.H., Anaya N. (2010) State Requirements for Physician Emergency Medical Services Providers. *Pre-hospital Emergency Care.* 14(2):164–166.

Galvagno Jr, S. M., Sikorski, R., Hirshon, J. M., Floccare, D., Stephens, C., Beecher, D., & Thomas, S. (2015). Helicopter emergency medical services for adults with major trauma. *Cochrane database of systematic reviews*, (12).

Grady, C. (2018). Ethical principles in clinical research. In *Principles and practice of clinical research* (pp. 19-31). Massachusetts: Academic Press.

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field methods*, *18*(1), 59-82.

Hansen, C. M., Kragholm, K., Granger, C. B., Pearson, D. A., Tyson, C., Monk, L., & Strauss, B. (2015). The role of bystanders, first responders, and emergency medical service providers in timely defibrillation and related outcomes after out-of-hospital cardiac arrest: results from a statewide registry. *Resuscitation*, *96*, 303-309.

Heider, F. (1958). The psychology of interpersonal relations. New York: Wiley

Institute of Medicine Committee on the Future of Emergency Care in the US Health System. (2006). Emergency medical services: at the crossroads. *Washington: DC*

Kabene, S. M., Orchard, C., Howard, J. M., Soriano, M. A., & Leduc, R. (2006). The importance of human resources management in health care: a global context. *Human resources for health*, *4*(1), 1-17

Kaji, A., Schriger, D., & Green, S. (2014). Looking through the retrospectoscope: reducing bias in emergency medicine chart review studies. *Annals of emergency medicine*, *64*(3), 292-298.

Kelley, E. (1972). Attribution in a social interaction. In: E. E. Jones, D. E. Kanouse,R. E. Nisbett, S. Valins & B. Weiner (Eds), *Attribution: Perceiving the cause of behavior* (pp. 1–26). Hillsdale, NJ: Lawrence Elbaum and Associates

Kironji, A. G., Hodkinson, P., De Ramirez, S. S., Anest, T., Wallis, L., Razzak, J., ... & Hansoti, B. (2018). Identifying barriers for out of hospital emergency care in low and low-middle income countries: a systematic review. *BMC health services research*, *18*(1), 291.

Kisii County Government. (2018). Annual Development Plan 2019-2020.pdf [Internet]. Retrieved 25 December 2019. Available from:

Kisii County Government. (2018). County Integrated Development Plan 2018-2022

Kisii.go.ke (2018). Kisii County Government acquires 10 new ambulances to boost health services [Internet]. Retrieved 25 December 2019. Available from: https://kisii.go.ke/index.php/item/1986-kisii-county-government-acquires-10-new-ambulances-to-boost-health-services

Kobusingye, O. C., Hyder, A. A., Bishai, D., Joshipura, M., Hicks, E. R., & Mock, C. (2006). Emergency medical services. *Disease control priorities in developing countries*, *2*(68), 626-628.

KNBS. (2014). The Kenya Demographic and Health Survey 2014 (2015). Retrieved 13 October 2021, from https://dhsprogram.com/pubs/pdf/fr308/fr308.pdf

KNBS. (2019). Population by County and Sub-County - Kenya National Bureau of Statistics. (2019). Retrieved 25 December 2019, from https://www.knbs.or.ke/?wpdmpro=2019-kenya-population-and-housing-census-volume-i-population-by-county-and-sub-county

Leung, L. (2015). Validity, reliability, and generalizability in qualitative research. *Journal of family medicine and primary care*, *4*(3), 324.

Maguire, B. J., O'Meara, P., O'Neill, B. J., & Brightwell, R. (2018). Violence against emergency medical services personnel: A systematic review of the literature. *American journal of industrial medicine*, *61*(2), 167-180.

Mahama, M. N., Kenu, E., Bandoh, D. A., & Zakariah, A. N. (2018). Emergency response time and pre-hospital trauma survival rate of the national ambulance service, Greater Accra (January–December 2014). *BMC emergency medicine*, *18*(1), 33.

McCusker, K., & Gunaydin, S. (2015). Research using qualitative, quantitative or mixed methods and choice based on the research. *Perfusion*, *30*(7), 537-542.

McLay, L. A., & Mayorga, M. E. (2010). Evaluating emergency medical service performance measures. *Health care management science*, *13*(2), 124-136.

Mehmood, A., Rowther, A. A., Kobusingye, O., & Hyder, A. A. (2018). Assessment of pre-hospital emergency medical services in low-income settings using a health systems approach. *International journal of emergency medicine*, *11*(1), 53.

Ministry of Health (2014). Kenya Health Policy 2014-2030 [Internet]. Nairobi. Available from: http://publications.universalhealth2030.org/uploads/kenya_health_policy_2014_to_2030.pdf

Ministry of Health (2014). [Internet]. Retrieved 25 December 2019. Available from: http://publications.universalhealth2030.org/uploads/ministry-of-health-referral-guidelines.pdf

Mock, C., Arreola-Risa, C., & Quansah, R. (2003). Strengthening care for injured persons in less developed countries: a case study of Ghana and Mexico. *Injury control and safety promotion*, *10*(1-2), 45-51.

Morse, J. M. (2016). *Qualitative health research: Creating a new discipline*. Abingdon: Routledge.

Mould-Millman, N. K., Dixon, J. M., Sefa, N., Yancey, A., Hollong, B. G., Hagahmed, M., ... & Wallis, L. A. (2017). The state of emergency medical services (EMS) systems in Africa. *Prehospital and disaster medicine*, *32*(3), 273-283.

Mounier-Jack, S., Griffiths, U. K., Closser, S., Burchett, H., & Marchal, B. (2014). Measuring the health systems impact of disease control programmes: a critical reflection on the WHO building blocks framework. *BMC public health*, *14*(1), 1-8.

Muchiri, F. W., Kariuki, J., Otundo, D., Mwagandi, L., & Karanja, S. (2017). Cost-efficient evaluation of ambulance services for community critical care transport needs in Machakos County, Kenya. *East African Medical Journal*, *94*(1), 12-19.

Nicholson, B., McCollough, C., Wachira, B., & Mould-Millman, N. K. (2017). Emergency medical services (EMS) training in Kenya: Findings and recommendations from an educational assessment. *African Journal of Emergency Medicine*, *7*(4), 157-159.

Nielsen, K., Mock, C., Joshipura, M., Rubiano, A. M., Zakariah, A., & Rivara, F. (2012). Assessment of the status of prehospital care in 13 low-and middle-income countries. *Prehospital Emergency Care*, *16*(3), 381-389.

Otieno, P. O., Wambiya, E. O. A., Mohamed, S. F., Donfouet, H. P. P., & Mutua, M. K. (2019). Prevalence and factors associated with health insurance coverage in resource-poor urban settings in Nairobi, Kenya: a cross-sectional study. *BMJ open*, *9*(12).

Palinkas, L. A., Spear, S. E., Mendon, S. J., Villamar, J., Valente, T., Chou, C. P., ... & Brown, C. H. (2015). Measuring sustainment of prevention programs and initiatives: a study protocol. *Implementation Science*, *11*(1), 1-11.

Patten, M. L., & Newhart, M. (2017). *Understanding research methods: An overview of the essentials*. Abingdon: Routledge.

Plevin, R. E., Kaufman, R., Fraade-Blanar, L., & Bulger, E. M. (2017). Evaluating the potential benefits of advanced automatic crash notification. *Prehospital and disaster medicine*, *32*(2), 156-164.

Rahman, N. H., Tanaka, H., Do Shin, S., Ng, Y. Y., Piyasuwankul, T., Lin, C. H., & Ong, M. E. H. (2015). Emergency medical services key performance measurement in Asian cities. *International journal of emergency medicine*, *8*(1), 12.

Razzak, J. A., & Kellermann, A. L. (2002). Emergency medical care in developing countries: is it worthwhile? *Bulletin of the World Health Organization*, *80*, 900-905.

Razzak, J., Usmani, M. F., & Bhutta, Z. A. (2019). Global, regional and national burden of emergency medical diseases using specific emergency disease indicators: analysis of the 2015 Global Burden of Disease Study. *BMJ global health*, *4*(2), e000733.

Ríos-Risquez, M. I., & García-Izquierdo, M. (2016). Patient satisfaction, stress and burnout in nursing personnel in emergency departments: A cross-sectional study. *International journal of nursing studies*, *59*, 60-67.

Rossinot, H., Lapandry, C., Adnet, F., Carli, P., Lecarpentier, E., Baer, M., & Veber, F. (2019). Is the French Emergency Medical Service System duplicable in developing countries? Helene Rossinot. *European Journal of Public Health*, *29*(Supplement_4), ckz186-097.

Samai O., Senegeh P. (1997). Facilitating emergency obstetrical care through transportation and communication, Bo, Sierra Leone. *International Journal of Gynaecology and Obstetrics* 59 Suppl 2:S157-64.

Sawe, H. R., Akomeah, A., Mfinanga, J. A., Runyon, M. S., & Noste, E. (2019). Emergency medicine residency training in Africa: overview of curriculum. *BMC medical education*, *19*(1), 294.

Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.

Seremwe, F., Kaseke, F., Chikwanha, T. M., & Chikwasha, V. (2017). Factors associated with hospital arrival time after the onset of stroke symptoms: A cross-sectional study at two teaching hospitals in Harare, Zimbabwe. *Malawi Medical Journal*, *29*(2), 171-176.

Sharma, J. (2018). Quality in universal health coverage. *Bhutan Health Journal*, *4*(2), I-II.

Song, M., & Meier, K. J. (2020). Walking the Walk: Does Perceptual Congruence Between Managers and Employees Promote Employee Job Satisfaction?. *Review of Public Personnel Administration*, 0734371X20966646.

Sorani, M., Tourani, S., Khankeh, H. R., & Panahi, S. (2018). Prehospital emergency medical services challenges in disaster; A qualitative study. *Emergency*, *6*(1).

Sriram, V., Gururaj, G., Razzak, J. A., Naseer, R., & Hyder, A. A. (2016). Comparative analysis of three prehospital emergency medical services organizations in India and Pakistan. *Public Health*, *137*, 169-175.

Stein, C., Wallis, L., & Adetunji, O. (2015). Meeting national response time targets for priority 1 incidents in an urban emergency medical services system in South Africa: More ambulances won't help. *South African Medical Journal*, *105*(10), 840-844.

Sullivent, E. E., Faul, M., & Wald, M. M. (2011). Reduced mortality in injured adults transported by helicopter emergency medical services. *Prehospital Emergency Care*, *15*(3), 295-302.

Suriyawongpaisal, P., Aekplakorn, W., & Tansirisithikul, R. (2014). A Thailand case study based on quantitative assessment: does a national lead agency make a difference in pre-hospital care development in middle income countries? *Scandinavian journal of trauma, resuscitation and emergency medicine*, *22*(1), 75.

Sutton, J., & Austin, Z. (2015). Qualitative research: Data collection, analysis, and management. *The Canadian journal of hospital pharmacy*, *68*(3), 226.

Wachira, B., & Martin, I. B. (2011). The state of emergency care in the Republic of Kenya. *African Journal of Emergency Medicine*, *1*(4), 160-165.

Weiner, B. (1985). An attribution theory of achievement motivation and emotion. *Psychological Review*, 92(4), 548–573.

Weheba, G., Cure, L., & Toy, S. (2018). Perceived dimensions of healthcare quality in published research. *International Journal of Healthcare Management*, 1-8.

World Health Organization. (2000). *The world health report 2000: health systems: improving performance*. World Health Organization.

World Health Organization. (2005). *Prehospital trauma care systems*. Geneva: World Health Organization. Available from: https://www.who.int/violence_injury_prevention/publications/services/39162_oms_new.pdf

World Health Organization. (2007). Everybody's business--strengthening health systems to improve health outcomes: WHO's framework for action.

World Health Organization. (2007). Health Systems: Emergency Care System (WHA60.22) [Internet]. Retrieved 25 December 2019. Available from: https://www.who.int/health-topics/emergency-care#tab=tab_2

World Health Organization. (2012). Road safety in Kenya. [Internet]. Retrieved 25 December 2019. Available from: https://www.who.int/violence_injury_prevention/road_traffic/countrywork/ken/en/

World Health Organization. (2018). Emergency Care System Framework Infographic [Internet]. Retrieved 25 December 2019. Available from: http://www.who.int/emergencycare/emergencycare_infographic/en/

World Health Organization. (2019). Emergency care systems. [Internet]. Retrieved 25 December 2019. Available from: https://www.who.int/emergencycare/systems/en/

Willemain, T. R. (1975). The status of performance measures for emergency medical services. *Journal of the American College of Emergency Physicians*, *4*(2), 143-151.

Willis, E., Reynolds, L., & Keleher, H. (Eds.). (2016). *Understanding the Australian health care system*. London: Elsevier Health Sciences.

Wilson, K. A., & Law, E. A. (2016). Ethics of conservation triage. *Frontiers in Ecology and Evolution*, *4*, 112.

Zakariah, A., Stewart, B. T., Boateng, E., Achena, C., Tansley, G., & Mock, C. (2017). The birth and growth of the National Ambulance Service in Ghana. *Prehospital and disaster medicine*, *32*(1), 83-93.

Zhang, Z. H., & Jiang, H. (2014). A robust counterpart approach to the bi-objective emergency medical service design problem. *Applied Mathematical Modelling*, *38*(3), 1033-1040.

APPENDICES

Appendix A: Participant Information and Consent Form

PARTICIPANT INFORMATION AND CONSENT FORM

EXPLORING THE FACILITATORS AND CHALLENGES OF EMERGENCY MEDICAL SERVICES USING A HEALTH SYSTEMS APPROACH: A CASE OF KISII COUNTY

SECTION 1: INFORMATION SHEET

Investigator: LYNDAH KEMUNTO MANOTI

Institutional affiliation: Strathmore Business School (SBS)

SECTION 2: INFORMATION SHEET–THE STUDY

2.1: Why is this study being carried out?

The study will explore facilitators and challenges of emergency medical services (Ambulance services.) in Kisii county. The results will inform the County Governments ministry of health on areas of improvement, so as to improve EMS services in Kisii County. The results can also be used by other counties or EMS operators, who intend to implement EMS services. Other counties can learn from the facilitators and challenges to establish EMS services in Kenya.

2.2: Do I have to take part?

No.

2.3: Who is eligible to take part in this study?

Personnel working in the EMS department in Kisii County Government. Either as a health manager or frontline EMS staff. Participants will be selected bases on their eligibility i.e. personnel in the EMS department and willingness to participate in the study.

2.4: Who is not eligible to take part in this study?

Health professional working outside the EMS department.

2.5: What will taking part in this study involve for me?

You will be approached by Lyndah Kemunto Manoti and requested to take part in the study. If you are satisfied that you fully understand the goals behind this study, you will be asked to sign the informed consent form (this form) and then taken through the interview process.

2.6: Are there any risks or dangers in taking part in this study?

There are no risks in taking part in this study. All the information you provide will be treated as confidential and will not be used in any way without your express permission.

2.7: Are there any benefits of taking part in this study?

The information will be used to improve service deliver in the EMS department in Kisii County.

There will be no monetary or compensation for participating in the study.

2.8: What will happen to me if I refuse to take part in this study?

Participation in this study is entirely voluntary. Even if you decide to take part at first but later change your mind, you are free to withdraw at any time without explanation.

2.9: Who will have access to my information during this research?

All research records will be stored in securely. That information may be transcribed into our database but this will be sufficiently encrypted and password protected. Only the people who are closely concerned with this study will have access to your information. All your information will be kept confidential.

2.10: Who can I contact in case I have further questions?

You can contact me, Lyndah Kemunto Manoti, at Strathmore Business School or by e-mail lyndah.kemunto@strathmore.edu, or by phone +254 721 462606. You can also contact my supervisor, Dr. Pratap Kumar, at the Strathmore Business School, Nairobi, or by e-mail pkumar@stathmore.edu or by phone +254 731 848163

If you want to ask someone independent anything about this research please contact:

The Secretary–Strathmore University Institutional Ethics Review Board, P. O. BOX 59857, 00200, Nairobi, email ethicsreview@strathmore.edu Tel number: +254 703 034 375

I, _____, have had the study explained to me. I have understood all that I have read and have had explained to me and had my questions answered satisfactorily. I understand that I can change my mind at any stage.

Please tick the boxes that apply to you;

Participation in the research study

☐ I AGREE to take part in this research

☐ I DON'T AGREE to take part in this research

Storage of information on the completed questionnaire

☐ I AGREE to have my completed interview recording be stored for future data analysis

☐ I DON'T AGREE to have my completed interview recording stored for future data analysis

Participant's Signature: _____ **Date:** _____/_____/_____

Participant's Name: _____ **Time:** _____ /_____

I, _____ (Name of person taking consent) certify that I have followed the SOP for this study and have explained the study information to the study participant named above, and that s/he has understood the nature and the purpose of the study and consents to the participation in the study. S/he has been given opportunity to ask questions which have been answered satisfactorily.

Investigator's Signature: _____ **Date:** _____/_____/_____

Investigator's Name: _____ **Time:** _____ /_____

Appendix B: Key Informant Semi Structure Interview Guide

This interview guide will be used by the interviewer to elicit responses on the successes and challenges of EMS from managers and frontlines EMS professionals. The open-ended questions are categorized into the six pillars of the health systems.

GENERAL QUESTION ON EMERGENCY MEDICAL SERCIVES

1. What is your role in the emergency medical services department?
2. In general, how would you describe the Emergency Medical Services in Kisii?
3. Could you describe the initial stages of EMS implementation?
4. What is the progress of EMS so far in Kisii County?

MEDICAL PRODUCTS, TECHNOLOGIES AND INFRASTRUCTURE – number of ambulances, equipment, drugs and other supplies

1. Could you give an overview of resources available from infrastructure, equipment and medical supplies?

    a) What is your take on the current EMS infrastructure in Kisii County?
    b) What is your experience on availability of medical supplies such as gloves and medicines in EMS?

2. Could you describe an incidence where you had a critical patient and had all the supplies you needed? How was the experience?

3. Are there any specific challenges regarding infrastructure, medical supplies or equipment that have encountered?

INFORMATION SYSTEM AND COMMUNICATION – telephone, GPS locator, EMR?

1. Could you describe the communication networks of the EMS. How to ambulance users contact the EMS call centre? How communication is between call centre-patient or caller-ambulance driver and paramedic – receiving facility?

2. Describe the record keeping process and documentation procedures?

3. Are there areas in the EMS communication and information sharing that need improvement? If yes could you highlight them?

HEALTH WORK FORCE – number, diversity, work environment

1. How can you describe your experience as an EMS staff?
2. What training did you receive before starting to work in EMS department?
3. Was the training(s) useful in your work? How did it improve your knowledge and skills?
4. How can you describe the EMS human resource – are the numbers adequate? Are the skills adequate? Is there diversity in terms of education background, experience, gender?
5. How can you describe the work environment? – culture, management/leadership engagement etc
6. What kind of support do the EMS staff receive in terms of training and continuous education?
7. Any notable challenges in regard to EMS staffing you have experienced?

SERVICE DELIVERY – type of services/cases, quality of services

1. Could you describe the services offers by the EMS department?
2. How important are the EMS to the community? – are the EMS services responding to the needs of the community and patients?
3. What are the cases do you respond to?
4. What measures to you (EMS) undertake to ensure quality of care- timely, safe, effective, efficient, patient centred care
5. Any notable successes in delivery of EMS?
6. What challenges do you experience in service delivery of EMS?

FINANCING

1. How are EMS financed? Who pays for the services? Any revenue generated?

2. How are EMS funds utilized? Transparency? Priority?
3. Could you highlight notable successes of the financing model?
4. Any specific financial challenges you could highlight?

LEADERSHIP AND GOVERNANCE

1. What are the policies that support EMS service delivery?
2. How does management and county leadership on supporting EMS?
3. What is the experience with the regulatory body EMS?
4. Are there any leadership gaps that you can highlight?

OVERALL

1. What impact has EMS services had to the health system and public?
2. What are some examples of successes or win you can associate with EMS?
3. What facilitated the successes/wins?
4. What recommendations could you give to improve EMS services?