UNIVERSITY OF NAIROBI

DEPARTMENT OF SOCIOLOGY AND SOCIAL WORK

INSTITUTIONAL CAPACITY IN DISASTER TRIAGE PRACTICE DURING MASS CASUALTY INCIDENTS: A CASE OF KISII COUNTY

BY

OBARA LENA MORAA

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DECLARATION

I the undersigned, hereby declare that this project is my original work and has not been presented for a degree or any other award in any other university or institution.

_____ _____

Obara Lena Moraa **Date**

C50/79640/2012

This research project has been submitted for examination to the Department of Sociology and Social Work, Faculty of Arts of the University of Nairobi with my approval as the University Supervisor.

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Dr. Robinson Ocharo **Date**

DEDICATION

This project paper is dedicated to all emergency response workers, for the effort they put in daily to save lives. For the paramedics/EMTs in Kisii County, thank you for the information you shared.

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ACRONYMS AND ABBREVIATIONS

WHO – World Health Organization

START – Simple triage and rapid treatment

SAVE – Secondary Assessment of Victim Endpoint

MCI – Mass casualty incident

RRTS – rapid response teams

PAHO – Pan African Health Organization

EMS – Emergency Medical Services

EMTS- Emergency Medical Technicians

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ABSTRACT

The purpose of this study was to establish if there is a practise of Disaster Triage in Kisii County. The main focus was to determine if there were Rapid Response Teams in Kisii County, to analyse their structures and systems and to examine the practise of disaster/ medical triage by the paramedics/ EMTs in Kisii County. The study was undertaken in Kisii Town, Kisii County. It adopted an exploratory research design which utilised the census method that aimed at contacting all the 18 paramedics and non probability (purposive) sampling method for the key informants. Structured interviews, in-depth interview guides and an observation checklist were used as key data collection instruments. The raw data from the field was analysed using excel and presented in frequency tables.

On establishing the existence of Rapid Response Teams, the study revealed that they have different roles that they are expected to play in terms of response to mass casualty incidents. Worth noting is that the county does not have an ambulance service of its own and therefore it subcontracted Kenya Red Cross to provide ambulance services and to act as first responders. The incentive to hire subcontractors is either to reduce costs or to mitigate project risks. In this way the general contractor could have provided by itself, at lower overall risk.
In regard to structures and systems of the Rapid Response Teams in Kisii County; the study established that the institutions had structures and systems that they operated under. The study however notes that, there is need for the county to formulate a structure that encompasses the institutions who act as first responders and come up with systems that are tailored to suit emergency response.

As for the practice of Disaster Triage in Kisii County, it was established that all the respondents knew the basics of a disaster triage that it was a process of sorting casualties in order of the extent of their injuries in mass casualty incidents to do the most good for all. Among the RRTS there are the paramedics/ EMTs who sort the casualties and begin initial treatment. It was established that out of the 9 units (ambulances) that the total emergency medical technicians worked with. The EMTs had on one occasion or another participated in the practice of triage. Disaster Triage/medical triage involves color codes. Because of the magnitude of the casualties, they are tagged, according to the extent of injury they suffered. 88.89% of the total respondents were aware of the correct tagging process/colour coding while the rest 11.11% were not aware of this. It was noted that not all respondents had participated in drill exercises 77.78% of the respondents had participated in drills, while 22.22% had not.

In conclusion, though there are RRTs in Kisii County with specific internal structures and systems. Their is need for the different institutions to have an official working relationship, with a common structure clearly outlining the role that each would be expected to play in case a mass casualty incident was to occur. There is also need to constantly train the paramedics/ EMTS on triaging through regular drill exercises.

The study therefore recommends that the county should have an ambulance service and paramedics of its own. It further on recommends that an official audit of the county equipment and personnel to be audited for better response in case disaster strikes.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The world health organization defines an event as a disaster when "normal conditions of existence are disrupted and the level of suffering exceeds the capacity of the hazard-affected community to respond to it. Where disasters are inevitable and have occurred, their impact can be substantially reduced by adequate preparation, early warning, and swift and decisive responses that can also be referred to as disaster risk reduction. In as much as there is emphasis on disaster risk reduction, disasters will still occur. Focus should be on how man is supposed to recover from these disasters, and especially the recovery immediately after a disaster has struck. Disaster recovery is largely influenced by the availability of resources, social support, recovery systems (community and government), working organizations that offer a structure for rescue and relief work and the victims' sense of responsibility and capacity to recover.

While a disaster by definition overwhelms response capabilities, a mass casualty incident (MCI) occurs more commonly and is defined as a situation that places a significant demand on medical resources and personnel (Tintinalli et al 2002). Local response capabilities might not be overwhelmed in this case, as much as medical resources and personnel. But their efficiency in responding contributes significantly to successful mass casualty management and response.

Mass casualty incidents (MCI) can take a variety of forms. Transportation systems (road traffic, aircraft, shipping, rail roads) account for many such incidents, as does industry (chemicals spills, factory files) buildings collapse or burn. Poisonings can result from sources such as restaurants or water supplies. Disease outbreak can quickly outstrip the ability of local health care facilities to contain and treat them. In fact, the mass casualty incidents that most countries experience on a regular basis are major accidents-road traffic, industrial as well as other incidents- with tens of victims, rather than larger numbers. For instance, about 1.2 million fatalities occur each year in traffic crashes, dwarfing the numbers killed in officially designated disasters (WHO 2004). A significant

proportion of traffic crashes, involve mass casualties particularly in developing countries (Maskrey, cited in WHO 1999).

Mass casualty incidents do not discriminate, they are not only experienced in developing countries but they significantly occur in developed countries that are assumed to be prepared for disaster response. An example is the September 11, 2001 terrorist attack in the United States. 19 militants associated with the Islamic extremist group al-Qaeda hijacked four airliners and carried out suicide attacks. Over 3000 people were killed and several others injured. The joint commission on accreditation of healthcare organizations has reported that since the September 11, many small communities in the United States are struggling to meet the mandate for emergency preparedness and response that would enable them to function on their own in the hours or days before help arrives. Readiness barriers include lack of clarity about who is responsible for preparedness and response planning, what element of the planning and response processes are critical, how to coordinate with state emergency management programmes, and how to obtain and sustain funding.

Mass casualty incident mapping was done during the world cup in South Africa; the risk management division of the provincial government of the Western Cape was used to determine the number of outsourced personnel available in healthcare facilities. Results showed that in Cape Town the personnel available for first response during a disaster are 17/100,000 people (population ratio) and 4.6/100,000 pre-hospital providers. The number of registered specialists was 33.8/100,000 population. This was in preparation for the world cup event that had an estimate of 450,000 expected people to watch the football in the stadium (Delaney 2001).

In mass casualty incidents, first responders use triage methods to sort out the victims. Simple triage and rapid treatment (START), is the most commonly used method of triage in classifying victims based on the severity of their injury. The Start method was developed in 1983 by the staff members of Hoag Hospital and Newport Beach Fire Department located in California. First responders using START evaluate victims and

assign them into one of the following four categories; Immediate (red), delayed (yellow), walking wounded/ minor (Green), deceased/expectant (black). The colours correspond to triage tags, which are used by some agencies to indicate each victim's status (Lerner, Schwartz, Coule, 2008).

Responders arriving at the scene of a mass casualty accident may first inquire whether there are any victims who are able to walk and ask them to relocate to a certain area. Therefore identifying the ambulatory or walking wounded. Non-ambulatory patients are then assessed. The only medical intervention used prior to declaring a patient deceased is an attempt to open the airway. Any patient who is not breathing after the attempt is classified as deceased and given a black tag. No further interventions or therapies are attempted on deceased patients until all patients have been treated. Patients who are breathing and have any of the following conditions are classified as immediate; respiratory rate is greater than 30 per minute, unresponsive (unable to follow commands). All other patients are classified as delayed. (Benson, Koenic, Schwultz, 1996). Disaster triage in mass casualty incidents brings together different actors for proper response and better results. They include the police, fire brigade, the hospital and organizations with the capability of offering ambulance and pre-hospital care like Red Cross, St John's Ambulance and many others.

With the strength of the above, it can be taken as an indication that collaborations need to be expanded and common approaches adopted including how to bring each actors on board despite their identities, structures, interests and mandate, for response in disasters.

1.2 Statement of the Problem

Substantial work has already been done and continues to be undertaken throughout the country to improve the ability of healthcare systems to respond to public health emergencies. Much of the planning in this area focuses on increasing the surge capacity of affected delivery systems through the rapid mobilization and deployment of additional resources from the community, state, regional or national levels to the affected area and identifying the available equipment and resources inform of institutional capacity to respond to mass casualty incidents. Research was done to determine the capacity of

different counties in Kenya to respond to disasters by the Ministry of special programmes in 2006, under Office of the president in the following areas; Kisumu, Eldoret, Nakuru, Mombasa and Nairobi. Below is a summary of the findings;

Kisumu County: Given the developments in Kisumu and the number of elements at risk, the city had far below capacity emergency equipments except for the health facilities. For example the fire tenders for the city at the municipal council are only two and one is completely grounded while the other needed repair. The Kenya Red Cross society had a warehouse in Kisumu that was underutilized. They felt that the warehouse could be used as a strategic point to store response gear. Kisumu serves as a port; however, both the Kisumu Railway police and the port did not have fire fighting equipment. As for ambulance services, the only identified ambulance services, apart from the hospital ones, was the St. John one. However, the van at the St John was not fully equipped.

Eldoret County: The known emergency equipment in Eldoret, were few and of those that were known they were not streamlined in any formal system of access. It was relatively endowed with health facilities. At the time, Eldoret town had one fire tender which was under repair (specifically, it had no starter). Most encouraging is that the town had just acquired an emergency response gear, fully equipped.

Nakuru County: Nakuru had health facilities that had not been streamlined into an emergency management system. The Kenya Red Cross Society in Nakuru is a big asset and if properly utilized, both its warehouse, and both food stocks and non food can be very useful during emergencies.

The municipality council facilities were very much wanting. The fire tender, though moving, was not properly equipped in any way to fight any kind of fire. The water company did not seem to have records of hydrants in the town. Overall the disaster management team was not functional.

Mombasa County: It was evident that they had done a sector wide approach (SWAP) analysis to help them improve their health care system.

At the police headquarters it was evident that they had difficulties in responding to disasters effectively because they had emergency lines that were not functional and that were misused by the public. The police also had inadequate facilities for instance there was only one boat and could therefore not respond to sea disasters effectively. However, despite all this the police collaborated with other organizations such as St John's Ambulance for trainings in First Aid and in Fire Drills and provision of ambulances.
The St John's Ambulance had most of their emergency equipment in good working conditions. But it was apparent that there was a big gap in disaster response measures and that there was a lack of co-ordination of resources amongst stakeholders.

Nairobi County: In Nairobi there was networking, partnerships and collaboration between government, NGOs, and the private sector in terms of disaster management and response. However it faced certain challenges that had an impact in the use of the capacities that existed. The challenges included; need to change attitude and commitment, needed for building teamwork, policy reform including legislation, ignorance of the law and enforcement.

The goal of medical response to a mass casualty event is to save as many lives as possible. To achieve this goal, health and medical care will have to be delivered in a manner that differs from the standards of care that apply under normal circumstances. This can be achieved through adequate preparedness and properly documented Mass Casualty Management Systems. That encompasses the group of units, organizations and sectors which work jointly, through institutionalised procedures, to minimize disabilities and loss of life in a Mass Casualty event through the efficient use of all existing resources (PAHO, 1995).

The Mass Casualty Management System is based on, pre-established procedures, to be used in daily emergency activities and to be adapted to meet demands of a major incident, maximizing the use of existing procedures, multi sectorial preparation and response and strong pre-planned and tested coordination (PAHO, 1995). To implement this system in a Mass Casualty Event, there are standard operation procedures that are used. A Mass

Casualty Incident may be declared at the scene by the initial responding units. Each team has a team leader that is most experienced. These procedures shall be implemented when personnel on the first arriving unit determine what will be required to transport all victims from the scene to area hospitals. Extreme care should be taken to minimize risk on respondents.

The officer in-charge on the first arriving Emergency Response Team shall be responsible for the initial scene assessment and coordination of the MCI response. He /She shall assume Incident Command per department policy and procedure and notify the Communications officer. The size-u report includes the nature of the incident and an approximation of the number of victims, allowing the communications office to anticipate the resources required to meet the immediate needs. The Incident Commander directs and coordinates all scene operations including routes the ambulances use and should notify the communications officer on those routes on the radio. The Incident Commander is also responsible for assigning personnel to fill the roles of Triage Team Leader and Transportation Team Leader. These roles are assigned to adequately trained personnel. The triage team leader's first responsibility is to provide rapid triage using the Simple Triage and Rapid Treatment (START). This requires the use of triage tags. The triage team leader works with the transportation team leader to ensure the victims have reached the hospital.

The above can only be successful through availability of resources, qualified personnel and proper coordination. The government of Kenya has been working with private organisations like the Kenya Red Cross to decentralise and distribute resources to the counties for Disaster Preparedness and Response. Kenya Red Cross signed a memorandum of understanding with the Kisii County government to provide advanced pre-hospital emergency medical services in the county. They also gave the county 9 ambulances. (Daily Nation October 22, 2013). They went ahead to sign another memorandum of understanding with Kisii University to train paramedics at the university.

There is no official report on Disaster Response Plans or Mass casualty Management Systems in Kisii, it's also not documented if there has been coordination of the different Institutions in case a Mass Casualty Incident occurred. If there is no documentation of the resources each institution has at a central unit of control and an emergency occurs then it will be difficult to act fast. This is an exploratory study aimed at establishing if there is a practice of disaster triage in Kisii County, if it conforms to the standards of operating procedures and to identify the capacity of the different Institutions in terms of personnel, equipment, vehicles available in case a mass casualty incident was to occur.

1.3 Research Questions

The research was guided by the following questions.

1. Are there Rapid Response Teams in Kisii County, which institution do they work for and what's the location of that institution?
2. Do they have structures and systems that they operate under, what collaborations to Institutions with the same mandate do they have?
3. Do the Rapid Response Team paramedics have knowledge on a working Disaster Triage, What material do they have in relation to these?

1.4 Objectives of the Study

1.4.1 General Objectives

The research sought to establish if there is a practice of Disaster Triage in Kisii County.

1.4.2 Specific Objectives

1. To establish the existence of Rapid Response Teams in Kisii County.
2. To analyse the structures and systems of Rapid Response Teams.
3. To examine the practice of Disaster Triage by the Kisii Rapid Response Teams (paramedics).

1.5 Scope and Limitation of the Study

The study sought to find out if Kisii County has emergency response teams in case of mass casualty incidents, and if those teams have well qualified team leaders. Focus was

on their composition and roles, challenges' and coping mechanisms. The study established that the paramedics/EMTs were informed on the components of a working triage. The study further on established if they had the equipment needed for a successful triage to take place and if the fire fighting equipment and ambulances were in working condition, how many they were and where they were stationed. Specifically the study sought to find out the position of response gear. If there was a command chain that would be used in case of any Mass Casualty Incidents and a Memorandum of Understanding between the institutions.

The researcher concentrated on the practice of disaster triage by paramedics who are the experts in the practice of triage but missed out on knowledge of other rapid response teams who include the police, other medics like doctors and nurses and fire fighters. Who must be present during triaging.

1.6 Definition of concepts

The following definitions applied for the purposes of this research project.

Triage is the prioritization of patient care (or victims during a disaster) based on illness/injury, severity, prognosis, and resource availability. The purpose of triage is to identify patients to a predesigned patient care area, thereby prioritizing their care, and to initiate diagnostic/therapeutic measures as appropriate (Mace E.S and Mayer T.A, 2006).

Disaster is a serious, sudden calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic and environmental losses that exceed the community's or society's ability to cope using its own resources. Though often caused by nature, disasters can have human origins.

Paramedics is often one of the first healthcare professionals on the scene of a accident or emergency. They are usually one of a two-person ambulance crew, with an emergency care assistant or ambulance technician to assist them.

Mass casualties is any number of casualties in a relatively short period of time, usually as the result of a single incident such as a stadium stampede, aircraft accident, road accident, hurricane, flood or armed attacks.

Mass casualty incident occurs more commonly and is defined as a situation that places a significant demand on medical resources and personnel (Tintinalli et al 2002).

Institutional capacity encompasses on one hand, the functions tasks and competencies to perform and on the other hand resources (human, technical and financial) and structures they need to that end.

Disaster/ emergency Management is the organised analysis, planning, and decision-making, allocation of resources, roles and responsibilities to prepare, prevent, mitigate, respond and recover/rehabilitate from disruptions by disasters.

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.0 Introduction

This chapter reviewed existing literature on mass casualty Incidents and the practise of Disaster triage in Kenya and Globally.

It introduced the phenomenon mass casualty incident and disaster triage. Structure of a disaster related triage and the operational side contingency planning. challenges and the future of disaster triage.

This section also described the theoretical framework and its relevance to the study.

2.1 Mass Casualty Incident

Mass casualty is any number of casualties produced in a relatively short period of time, usually as the result of a single incident such as a stadium stampede, aircraft accident, road accident, hurricane, flood, or armed attack that exceeds local logistics support capabilities. In the case of armed attack, Gary Lafree, Director of National Consortium for the Study of Terrorism and Responses to the Terror is at the University of Maryland, said Al Qaeda, the terrorist organization founded by Osama Bin Laden, and was responsible for fomenting more mass casualty attacks than any other groups in history.

The Japan triple Disaster 2011 (Earthquake, Tsunami, Nuclear meltdown) David Pachioli, 2011 reported that the chain of calamity began with a massive rupture in the ocean floor there was an earthquake. The tremendous up thrust from the sea flour unleashed a series of enormous tsunami waves. At the Fukushima Da-ichi nuclear power plant, the earthquake had already knocked out electricity, but emergency backup systems seemed to be functioning property.

Then the Tsunami hit, flooding the plant and incapacitating its backup generators, without their cooling systems three of the plants six reactors began to overheat, the build up of hydrogen gas generated by melting nuclear fuel resulted in colossal explosions in these three units and damage to the containment structure of a fourth reactor, thousands

of tens of water were poured in to the reactors from water cannons, fire trucks and helicopters. The water picked up radioactive isotopes from the reactors and eventually drained to the sea. The tsunami alone killed 20,000 people, and displaced more that 150,000 others. Economic losses have been estimated at anywhere from $ 250 billion to $500 billion.

According to (Husted, 2011) a Mass Casualty Incident is an event that exceeds the health care capabilities of the response. It's present when health care needs exceed resources. While a disaster by definition overwhelms response capabilities, a Mass Casualty Incident occurs more commonly and is defined as a situation that places a significant demand on medical resources and personnel (Noji et al, 2000). A commonly occurring example of Mass Casualty Incidents in Kenya is a multiple vehicle or bus collision. Regardless of whether a situation is classified as a medical disaster or a Mass Casualty Incident, it requires rapid and effective triage methods. In order to optimise overall patient outcomes in a catastrophic situations, there is a shift from doing what is best for the individual patient to doing the greatest good for the largest number of people. (Koenig et al 2006).

According to (Penny, 2007)the basic operational principles for dealing with an incident which results in mass casualties are the same as for a major incident and all organizations that contribute to disaster response must have contingency plans that;

1. Demonstrate that they fully understand the scale and nature of the disruptive threat(s) to their organization and any actions that may be needed, though involvement in multi-agency risks assessments in their area.
2. Include appropriate measures to prevent an incident, if possible, or to mitigate its effect on the health of the community.
3. Place particular emphasis on inter-operational and mutual aid-both within and between strategic health authority regions, and with the Devolved Administrations where applicable.

4. Consider measures to utilize all existing National Hospital Services capacity in acute, primary and independent care settings more intensively, taking into account the need for a sustainable response.
5. Recognize the potential need to expand existing capacity to cope with larger numbers of patients, including the possibility of introducing revised treatment protocols.
6. Include proposals to utilize and deploy staff differently where that is required.
7. Facilitate joint working by adopting common core systems and equipment as far as that is practical.
8. Promote and support a return to normality as soon as feasible
9. Undertake a structured debrief.

2.2 Particular challenges

Mass casualty incidents will involve a step change in the demands that are made on all parts of the National Hospital service and partner organizations. Doing more of the same is unlikely to be adequate- organizations and their staff will need to adopt a different approach to their planning and response for such incidents in order to cope. For the response to work effectively there needs to be a whole systems approach into the way healthcare is delivered. This means all sections of the National Hospital system, including primary care organizations, foundation trusts, the independent sector, and voluntary sector partners need to be engaged in any strategic emergency pre-planning work as well as the operational response (Penny, 2007).

Penny, 2007, further on says that some of the factors that distinguish a mass casualty's incident from a more typical major incident are its likely scale, duration, intensity and the probability that there will be other compounding factors such as loss of services/ infrastructure, shortage of essential supplies or the possibility of civil dislocation. They are likely to involve greater numbers, both in terms of casualties and facilities, and could involve either incidents occurring simultaneously, or at multiple sites (either in close proximity or more widely spread). It is also likely that there will be significant media and public information challenges, which should be considered in local planning.

2.3 Disaster Triage

Triage is the prioritization of patient care (or victims during a disaster) based on illness/injury, severity, prognosis, and resource availability. The purpose of triage is to identify patients to a predesignated patient care area, thereby prioritizing their care, and to initiate diagnostic/therapeutic measures as appropriate (Mace E.S and Mayer T.A, 2006).

The term triage originated from the French verb trier which means to sort. During the time of Napoleon, the French military used triage to serve as a battlefield clearing hospital for wounded soldiers. The U.S Military's first use of triage was during the civil war. Triage on the battlefield was a distribution centre from which injured soldiers were sorted or distributed to various hospitals.

Other situations which the triage process has been employed, in addition to the battlefield, are during disasters, following Mass Casualty Incidents (MCI), and in emergency departments. Triage during a disaster involves field triage, which sorts disaster victims into categories ranging from the walking wounded to those with injuries who are salvageable to the unsalvageable and the dead.

2.3.1 Field Triage

Field triage by Emergency Medical Services personnel is the assessment of individual patients with the purpose of determining the most appropriate receiving facility. The development of trauma systems led to trauma triage in pre-hospital care. This is based on the principle that patients with life threatening or serious multiple injuries from trauma have a better outcome when transported directly to a facility staffed and equipped to provide resuscitation and definitive treatment. The aim is to send all seriously injured patients to a trauma centre without overwhelming the resources of the trauma centre by over-tagging. Occasionally a trauma patient may bypass the closest hospital to be transported directly to the trauma centre. (Heide der Auf, 1989).

2.3.2 The Triage Process

The purpose of disaster triage is to identify critically ill patients and assure that they receive immediate resuscitation, the main principle being to do the most good for the most people. It is possible during a disaster with limited response resources, some patients who have little or no chance of survival, will not be resuscitated. (Waeckerle J F, 1991). It's often a difficult concept for healthcare providers to ration resources and not expend efforts to resuscitate patients who are considered rear death in order to save others. Comfort care should be provided to the dying patients when resources become available.

As with disaster triage, there are different systems that are used in the process of triage. Triage systems vary according to where they are to be applied. One of the Standardized systems for Mass Casualty Incidents is the Simple Triage and Rapid Treatment (START) technique (Schutz C H et al, 1996). This is based on rapid assessment of Respiration, Perfusion, and Mental status (RPM casualties who are ambulatory are asked to move away from the immediate area of the incident.

These walking wounded are categorized as "green" or minor. The remaining patients are sorted into unsalvageable, immediate and delayed. If the patient has a patent airway and is breathing, by assessing the respiratory rate (> 30 per minute or <30 per minute), the radial pulse (present or absent), and the mental status (follows commands: yes or no). Unsalvageable patients are patients who are not breathing even after positioning their airway and are classified "black" or deceased. "Red" (Immediate) patients have an immediate threat to life or limb but, if given immediate care, will probably survive.
Examples include a patient with altered mental status, labored respirations, or shock. "Yellow" (delayed) patients have significant injuries but can probably tolerate a 45 to 60 minute wait without undue risk.

The figure below shows the SAVE triage system: a Colour coded tagging method used to categorize disaster victims. It has been almost universally adopted and incorporated into existing triage systems. (Kenedy K. Et al, 1996).

1. Red Triage Tag ("immediate" or T1 or Priority 1): Patients whose lives are in immediate danger and who require immediate treatment.
2. Yellow Triage Tag ("Delayed" or T2 or Priority 2): Patient whose lives are not in immediate danger and who will require urgent, not immediate, medical care.
3. Green Triage Tag ("Minimal" or T3 or Priority 3): Patient with minor injuries who will eventually require treatment.
4. Black Triage Tag ("Expectant" or No Priority): Patient who either dead or who have such extensive injuries that they cannot be saved with the limited resources available.

Kenedy et al, (1996), Goes ahead to state that the expectant category can be the most challenging for care givers from an ethical and an emotional stand point. While it is logical to help the greatest number of victims in a disaster, it is difficult to walk away from a person who is on the verge of succumbing to severe injuries. As the world medical association reminds us, it is ethical for a physician to persist, at all cost, at maintaining the life of a patient beyond hope, thereby wasting to no avail scarce resources needed everywhere. (World Medical Association Publications May 11, 2010). Lee 2010, says its important to note that patients need to be reassessed repeatedly, and initial color-coded triage designations can change over time.

2.3.3 START Triage.

The Secondary Assessment of Victim Endpoint (SAVE) triage system was developed to identify patients who have the greatest possibility of benefit from care delivered austere field conditions. (Benson M. et al, 1996). SAVE is employed when patient transport to a definitive care facility is not available for days and treatment within the "golden hour" at a medical centre is non-existent (Schultz CH, 1996).

The three patient groups according to the SAVE triage are:

1) Patients who will die no matter what treatment is rendered,
2) Patients destined to survive whether or not care is given, and
3) Patients for whom significant benefit will be obtained from "austere field interventions" causalities who would benefit most from early evacuation (e.g. , a patient with intra-abdominal haemorrhage) are designated as "first out"

2.4 The future of Disaster Triage

With the increase of Disasters in a era of diminishing resources, and the publics demand for more rapid treatment along with governmental regulations and the focus on patient safety and quality, triage will be expected to perform an even more complex and important role in the future. (Richardson L.D et al, 2002). Triage in the future is expected to have new systems and processes and expanded technology to streamline patient flow.

Current technology such as in room registration and discharge by mobile patient registrars using laptop computers may be replaced by hand held devices. More elaborate instantaneous patient tracking systems are possible. Real time communication via cell phones or microchip tracking technology will allow the triage nurse to instantly see and communicate with patients and families in the waiting room and other areas. Medical information, including medications, allergies, and past medical history, will be automatically available via computer, rather than manually entered, in a fashion that protects patients confidentiality. (Barthell E. N et al, 2004).

Such advances, however, are dependent on the necessary financial resources and continuing technological advances.

2.5 Theoretical framework

2.5.1 System Theory

System theory was founded by Ludwig Von Bertalanffy, William Ross Ashby and others between the 1940s and the 1970s. It's the transdisplinary study of the abstract organisation, interdependent of their substance, type or spatial or temporal scale of existence. A system is said to consist of four parts. The first is objects- the parts, elements

or variables within the system. These may be physical or abstract or both, depending on the nature of the system. Second, a system consists of attributes- the qualities or properties of the system and its objects. Third, a system has internal relationships among its objects. Fourth, systems exist in an environment.

A system then is a set of things that affect one another within an environment and forms a larger pattern that is different from any of the parts. The fundamental systems interactive paradigm of organizational analysis features the continual stages of input, throughput (processing), and output, which demonstrates the concept of openness/closedness. A closed system does not interact with its environment. It does not take in information and therefore is likely to a trophy that is to vanish. An open system receives information, which it uses to interact dynamically with its environment. Openness increases its likelihood to survive and prosper. Several systems characteristics are: wholeness and interdependence (the whole is more than the sum of all parts), correlations, perceived causes, chain of influence, hierarchy, goal-oriented, interchange with the environment.

A system is composed of regularly interacting or interdependent groups that form a whole. System thinking is a holistic approach that focuses on the way that a system's constituent parts interrelate and how systems work overtime and within the context of larger systems. The systems thinking approach contrasts with the traditional analysis which studies systems by breaking them down into their separate elements.

2.5.2 Assumptions of the system theory

Based on Russell Ackoff's suggestion that a system is a set of two or more interrelated elements with the following properties:

1. Each element has an effect on the functioning of the whole.
2. Each element is affected by at least one other element in the system.
3. All possible subgroups of elements also have the first two properties. (Ackoff, 1981, pp, 15-16)

An example is a county as a whole but in the county there are different organizations/ institutions including , hospitals, NGOs, schools, the police, fire brigade that work together for the well being of the community. In case of an incident that leads to casualties all these functions are required to work together in order to produce desired results. The county has units that coordinate these different institutions so as they can interact.

Integrated disaster management, Involves complex interactions within and between the natural environment, systems theory is based on the definition of a system- in its most general sense as a collection of various structural and nonstructural elements that are connected and organized in such a way as to achieve some specific objectives through the control and distribution of material resources, energy, and information. The basic idea is that all complex entities are composed of different elements linked by strong interactions, but a system is greater than the sum of its parties. (Burke et al, 1993).

Von Bertalanffy emphasized that real systems are open to and interact with their environments, and that they can acquire qualitatively new properties through emergencies, systems theory focuses on the arrangement of and relations between the parts which connect them into a whole (wholism). For proper disaster recovery all parts of the system must work interdependently and support each other. From government to Non- governmental organization in coordinating equipment and resources.

2.5.3 Critique of systems theory

Lillianfeid (1978) pegs systems theory as the ideology of the planner and the bureaucrat, but also identifies the systems approach's fatal flaw as its lack of utility. The systems approach does not work well enough to stand on its own merits. Gerson (2007), Hughes and Hughes (2000), and others have also argued that systems approach fell out of favor because it didn't work well enough, especially in the case of solving the problems of the cities in the 1960s.

In the early 1970's the sociologist Ida Hoos criticized systems approaches extensively, especially its role in planning, management and government. Hoos faulted systems for its promiscuous use of quantitative models, that is for using tools that might not be appropriate for the situation at hand. She also believed that systems left insufficient room for the 'human factor' of real people acting in ways not predicted by the system.

But just as the systems approach did not fall because it did not function well enough, it also did not fall because it had a few critics. Rather, the systems approach, especially the systems- managerial tendency within it, was tied to the fate of the larger social arrangement that made planning, management, and control seem like viable and desirable options for working with complex phenomena in government, in organizations, and in nature. The under pinning of those assumptions were rocked, beginning in the 1960s, and increasingly in the 1970s until the systems approach was mostly abandoned along with the strategies and institutions that had previously supported it (Pickering, 2010).

2.5.4 Mass Casualty Management Approach

Mass casualty management approach includes pre-established procedures for resource mobilization, field management and hospital reception. It's based on specific training of various levels of responders and incorporates links between field and health care facilities through a command post. It acknowledges the need for a multi-sectoral response for triage, field stabilization and evacuation to adapted health care facilities. The development of this approach was based on the availability of large amounts of human and material resources ("adequate manpower and equipment")

Attempting to replicate this approach in a country with limited resources does not result in the expected level of effectiveness. In such situations, the mass casualty management approach should be adapted with special attention given to a country's specific situational problems (Butman, 1982)

2.5.5 How the approach is related to my study

In seeking to establish if the rapid response teams in Kisii County are well versed with the practice of disaster triage in case a mass casualty event was to occur. It's important to note that there are standards of operation procedures for different disasters. Preparedness is very important, for it gives a direction that disaster response and recovery will assume. For a successful triage to take place in a casualty incident there should be properly pre-established procedures for resource mobilization, field management and hospital reception. This is drafted in a contingency plan that should be held at certain control centers. In this case the county should have a contingency plan and a copy given to the different team players example the police, Kenya Red cross, main hospitals (Kisii level 5 hospital), five departments and any other team player. That consists of the role each party is expected to play in case a mass casualty incident occurs. The contingency plan should have a clear chain of command.

This approach is suitable because it's based on the availability of adequate manpower and equipment but in case a country has limited resources, and then the approach can be adapted with specific attention given to the county's specific situational problems. In this case, it can apply in Kisii County; it's tuned to the material and human resources at the dispersal of the county.

2.5.6 Critique in developing mass casualty management approach.

Limited human resources; Due to a shortage of human resources, a country will experience difficulties in developing, training and maintaining specialized personnel. Since staffs are fully occupied with daily routine tasks, it will be difficult to develop a mass casualty management approach with staff exclusively reserved for emergency management. These countries, therefore, must either persist at a lower level of organization or they are forced to "import" a non-adapted organization.

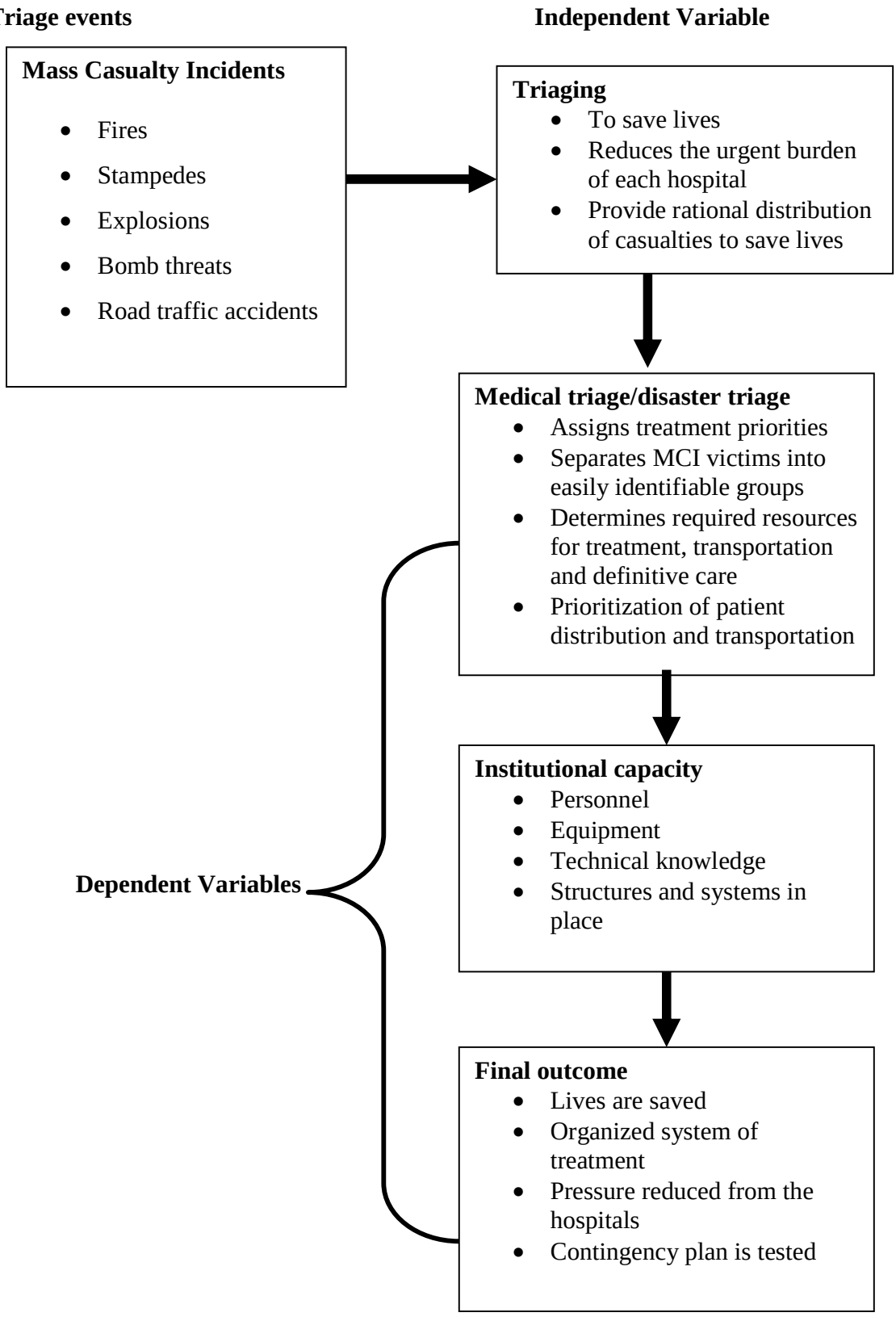
Limited material resources, this can be one secondary/tertiary hospital for an area that is equipped few proper mass casualty response and minimal transport resources (ambulances).

Lack of radio communications; the three conditions above will prevent a smooth and well-coordinated dispatch of victims of a mass casualty incident to various health care facilities. Rescuers will be obliged to carry all victims to the only care facility available, which may overwhelm the health care system.

Poor communications (topography and isolation). Access to a mass casualty incident site will be hindered by difficult topography. Road evacuation of victims is difficult in mountainous areas, particularly in developing countries. This delays the arrival of the victims to the care facilities.
Moreover the transportation of patients under difficult conditions will have a negative impact on the patient's status. Certain topography will also result in problems with radio communication a basic requirement for the organization of rescue.

Isolation, external assistance will have difficulty reaching isolated areas. This isolation can be permanent (for example in the case of island, remote mountain areas, or forest settlements) or temporary (after floods, landsides, snow, or bridge collapse). The disaster response plan in these areas must take into consideration the fact that they can stay isolated for extended periods. This dimension must be included in any mass casualty approach.

Figure 2.1 Conceptual framework



There are different emergencies that can lead to mass casualties, including fires, stampedes, explosions, road traffic accidents and bomb threats.
For the emergency response teams to save lives and reduce the impact of these emergencies they require triaging. Triaging is the process of sorting out the victims of an emergency in order to save lives, reduce the urgent burden to each hospital and to provide rational distribution of casualties to the hospitals. In medical triage/disaster triage treatment priorities are assigned, victims of mass casualty incidents are separated into easily identifiable groups and prioritization of patient distribution and transportation.

For the whole process of medical triage to be successful it depends on institutional capacity in terms of personnel, equipment, technical knowledge and the systems and structures in place in relation to emergency response.
If the capacity is sufficient and triage is properly conducted, then lives will be save, pressure reduced from the hospitals and most important the contingency plan is tested.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter sets out the research methods that were used in data collection, processing and analysis. It has the following sub-sections:-Research design, site description, sampling procedure, methods of data collection, tools, unit of observation and analysis, data collection procedure, data processing and analysis and ethical considerations.

3.2 Research Design

Research design guides in data collection, analysis and interpretation. This study used an exploratory study design and it sought to establish if there were rapid response teams in Kisii County, if they were there, were the paramedics aware of the components of a working disaster triage, in case a mass casualty incident was to occur within the county. The study established the existence of rapid response teams in Kisii County, their knowledge of a working disaster triage, capacity in terms of equipment and how to respond to a mass casualty incident.

3.3 Site description

The study was carried out in Kisii town, Kisii County. It was the headquarters of the original and larger Kisii District before it was split to create Nyamira district into the north and Gucha, a district in the South. However with the passing and the promulgation of the new Kenyan constitution in August 27, 2010, Gucha District was re-absorbed back into Kisii County; Nyamira District has been renamed Nyamira County. Kisii has an estimated population of about 1,152,282 million and an annual growth rate of 2.75% according to the 2009 census. It's the main urban and commercial centre in the Gusii Highlands and the South Nyanza Region. The population of Kisii town is currently at 200,000, as per 2012 estimates by the local government. It is the second most populous town in Nyanza after Kisumu. Below is an overview of institutions that comprise the Rapid Response Teams;

Kenya Red Cross

The offices are located in Kisii town. For many years it has been the main organization that responds to disaster in Kenya. There is not a disaster/ emergency situation that can happen in the country without us witnessing their presence. They provide ambulance services and personnel in many parts of the country and Kisii is not an exception. There are currently 9 ambulances with 18 paramedics/ technicians in the county, who are stationed in the 9 sub counties in Kisii County.

Kenya Police

Located within the town centre, it's the law enforcement organ in the county. The police play a key role in emergency situations; they are expected to provide security, map the scene of the accident, protect property, record statements and can even come in handy in transporting and identifying the dead. At the time of the study, the police had undergone first aid training and even had a competition on emergency response in the first week of May 2015 in Kisumu. They had tapes for mapping an area but no ambulances or other heavy equipment.

St John Ambulance.

The Institution is located in Kisii Town. Just like Kenya Red Cross, their main mandate is to provide ambulance services and train personnel in emergency response/ first aid. By the time of this study, they had no ambulances of their own. Had 50 trained active community members (Volunteers).

Kisii County (Department of Disaster Management)

The department of disaster management in the county is located directly opposite the Post Office in Kisii Town. The fire trucks are controlled by this department and they are two. By the time of the study they were both in good working condition and parked outside the county offices. The county has contracted Kenya Red Cross to provide ambulance services in case of emergencies. The county had no additional ambulances other than the ones with Kenya Red Cross.

Kisii Referral Hospital

Kisii level 6 Hospital is located in Kisii Town, it's the main hospital in the county and presumed to have equipment and personnel to respond to emergencies. With its growth, it has a larger bed capacity and some complex operations can be done there. By the time of this study it had shortlisted paramedics, but it was not confirmed when they would begin operations. The hospital depended on the Kenya Red Cross Ambulances for the ones it had were no longer in working condition.

Inform Africa, 2012, gathered that the county has a good amount of health facilities open to over 1 million residents living in the area, Kisii county has 4 district hospitals, 9 sub-district hospitals, 80 dispensaries, 23 health centres, 12 medical clinics and 2 nursing homes. Notable hospitals include: Gucha and Kisii referral hospitals and Tabaka Mission Hospital.

Areas likely to produce mass casualties in Kisii

The Kisii Stadium (Gusii Stadium); normally the venue is scheduled for Kenya premier league (KPL) soccer tournaments and locally organized sporting events. It also hosts an annual Agricultural Society of Kenya show, and numerous political rallies. These events might lead to stampedes, which can lead to mass casualty events.

Fire outbreak in schools; schools are not safe either from disasters like fire outbreaks. If there is an incident like it, will the county have the capacity to respond and manage it? Schools in Kisii town include Kisii High School, Kereri girls, Nyabururu girls, Cardinal Otunga High School, Kioge Girls, Itierio Mixed, and many more.

Roads; Kisii County has experienced gruesome road accidents. That have in the past produced a number of mass casualties; Example is the accident involving a school bus for Rioma secondary school in the Nyambunde area, Sameta sub-location, on 10th July 2013 that consumed 20 lives and over 50 injured students and teachers. On 31st August 2007 a multiple vehicle accident in the Daraja Moja area of kisii Town, more than 30 people were reported dead and over 23 injured. And many more cases.

Manga Escarpment Kisii; the Manga is a dormant volcanic hill. Meaning, it has potential to erupt, just that it's not known when. Many people have settled on the hill and around it. If it was to erupt it would lead to thousands of casualties. Manga is a potential area for mass casualties.

3.4 Sampling Design and Procedure

Non probability sampling technique (purposive sampling) was used to select key informants for in-depth interviews, who included; The Director for Disaster Management in the county, The OCS Kenya Police in Kisii County, Representative Kenya Red Cross Kisii County, Representative St John's Ambulance Kisii County, and the Nursing Services Manager Kisii Referral Hospital, this was because the researcher had to identify the most appropriately placed person in terms of experience, knowledge, authority and expertise.

All the paramedics in charge of emergency response in Kisii who are 18 in number were interviewed therefore a census. The major consideration was that the paramedics were best placed to give their opinion and experiences in the practise of triage.

3.5 Methods of Data Collection

This study used interview method and direct observation for visual capturing of equipment. Interview method was suitable because it enabled the researcher to pursue in-depth information around the study. Face to face interviews were conducted with the paramedics in order to obtain required information from the paramedics. Use of this method was appropriate to help clarify questions in order to get the right responses.

In-depth interviews were conducted with the key informants to enable the researcher gather rich information on key areas of the study.

3.6 Tools of Data Collection

Interview schedules were developed for the paramedics. Simply put, an interview schedule is a pre-coded tool that specifies the order and the wording of questions and often filled by an enumerator. Structured interview schedules were administered to the respondents and answers were recorded alongside the questions and coded. While the information sought from the paramedics was the same, clarifications on the questions were made for each respondent to ensure they gave the intended information. Therefore the researcher factored in the issue of reliability especially internal consistency in the interview guides.

Interview guides were designed and used to gather in-depth information from the key informants. They were precise with brief open ended questions addressing the three objectives of this study an observation checklist was used to guide the researcher in identifying if the institutions had equipment, a contingency plan or emergency response systems.

3.7 Unit of Analysis

In this study the units of analysis were the RRTs in specific the paramedics/EMTs who carry out disaster/ medical triage. The study sought to establish if the Rapid Response Teams are adequately prepared to carryout disaster triage on case a mass casualty incident occurred.

3.8 Unit of Observation

The study focused on Rapid Response Teams in Kisii County.

3.9Data collection procedures

The researcher obtained an introductory letter from the university identifying her as a student and that the research will be entirely for academic purposes. Then a visit was made to the study sites and permission sought from the relevant authority and a date was set for the start of the interview.

3.10 Data processing and analysis

Reponses to specific questions were summarized, coded and categorized using common themes and phrases relevant to the research questions. The data collected was analysed and presented in frequency tables.

3.11 Ethical considerations

The researcher arranged a meeting prior to the interview date so as to notify team leaders of the Rapid Response Teams of the intended study.

This enabled the team leader to communicate to the paramedics. The researcher once given a go ahead to conduct the interviews promised the interviewees to keep the information provided confidential.

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This data was collected with the aim of establishing if Kisii County has capacity in terms of personnel and equipment to conduct disaster triage in mass casualty incidents. The data was collected from heads of selected institutions and the paramedics working with Kenya Red Cross in Kisii County. The institutions selected are located in Kisii Town.

4.2 Overview of the Institutions

Disasters occur without prior warning and they end up testing the capacity of a certain region to respond to disasters. An example is the Garissa University terrorist attack that took place on 2nd April 2015. At least 147 people were reported dead including students and security personnel. The government of Kenya with other relevant Institutions joined forces and transported the casualties to Nairobi. The Nyambunde area school bus accident, on 10th July 2013. That claimed the lives of 20 students and injuring many more, influenced the growth of disaster preparedness in Kisii County. The capacity of different Institutions in Kisii was tested; including the hospitals, the police. These experiences show the importance of examining the capacity of different institutions to conduct disaster/ medical triage in mass casualty incidents.

Disaster/ medical triage is the process of determining the priority of patient's treatment based on the severity of their condition. This rations patient's treatment efficiently when resources are insufficient for all to be treated immediately (NHS, 2013). Conducting triage in mass casualty incidents is the best solution, because in those cases there are more casualties as compared to the resources available in terms of personnel and equipment. Where there are mass casualties then conducting triage is the best option. The triage process involves several expertise. Among them are the initial responders known as Rapid Response Teams.

RRTs are teams that respond to emergencies; they include the police who provide security and map the scene, teams that provide emergency medical care example Kenya Red Cross and St John Ambulance who provide ambulance services, provide emergency medical care and trauma support and counseling. Fire brigade, who fight and prevent fires, conduct damage control and salvage, render humanitarian services and the hospital team that assist in emergency medical care, ambulance support and are at the receiving end of a triage. They have different roles that they play to make the triage process successful. Thus the need to establish if the RRTs in Kisii county have collaborations, their identities, structures, interests and mandate and to know if they have any forms of agreement, whether formal or informal in order to avoid duplicating of efforts.

4.3 DEMOGRAPHIC DATA.

The study targeted Institution leaders and paramedics from purposively selected Institutions within Kisii town. In these institutions, one is likely to find employees of different ages, male and female, and people with different levels of education. The researcher sought to gather demographic data of the respondents and the findings are as stated below.

Table 4.1 Age distribution of the respondents

Age	**Frequency**	**Percentage**
20-35	14	77.8
36-45	4	22.2
Total	**18**	**100.0**

Out of the total (18) paramedics that were interviewed in Kisii, 77.8 percent were aged between18 and 35 years while 22.2 percent were aged between 36 and 45. This can be attributed to the fact that the field of emergency medical services in Kenya is as old as 15 years now. There is a large percentage of youth, but they have the required certificates in

EMS that are qualifies one to practice as a paramedic, a certificate in EMS takes just 3 months to enable one to have basic life saving skills to practice as a paramedic.

Table 4.2 Gender of the respondents

Gender	**Frequency**	**Percentage**
Male	16	88.9
Female	2	11.1
Total	**18**	**100.0**

The study findings revealed that 88.9 percent of the respondents were male while 11.1 percent were female. From the findings above, it is evidence that the EMS field is riddled with cases of gender disparity. Women continue to be under represented in the medical field. Negative gender stereo types are known to lead to career avoidance (Pelaccia, 2010). The career pathway of women is also affected by family life for example maternity leave, another factor is that the operational hours of paramedics are not known for an emergency can occur at any time, even to midnight or the early hours of morning. For a woman to be married and still comfortably operate as a paramedic it's still a challenge. This is clear from the response below by a key informant;

"It is hard for women to survive in this field for a long time or to even consider taking it up because of the challenges that come with it, working hours and lifting of victims for transfer to a medical facility. Example if there is an emergency on the fifth floor of a building, and there is no elevator and the paramedics have to move the casualty then it's a heavy task for most female."(42 year old Male)

Table 4.3 Education levels of the respondents

Education	**Frequency**	**Percentage**
Certificate	7	38.9
Diploma	10	55.6
Degree	1	5.5
Total	**18**	**100.0**

The study findings revealed that 38.9 percent of the respondents had attained certificates in emergency medicine as their highest level of education, 55.6 percent were diploma holders in emergency medicine and 5.5 percent had attained a degree. Though the majority are of lower level of formal education they had attained training in emergency medical services. As a condition of practicing all the paramedics have been trained and certified in emergency medical services is an indicator of one having received basic life support training, they had the training to resuscitate patients, loading and offloading patients in a mass casualty incident, and they could sort patients, dress wounds and stabilize fractures. While the diploma and degree holders had received training in advanced life support in addition to the ones of a certificate holder.

4.4 To establish the existence of rapid response teams in kisii county:

Emergencies occur in most cases without prior warning it is important to have a response plan in place complete with medical emergency response teams. The researcher sought to establish if there are teams set aside specifically for emergency response in Kisii County. Predetermined questions were asked to establish if there were any teams set aside for emergency management. The roles they play in emergency response.

4.4.1 Establishing the existence of emergency response teams

The researcher sought to find out if there were any teams set aside for emergency management in the different institutions. They had different roles that they played in a triage and so they had teams set aside for emergency management. The following are the institutions and their designations;

Table 4.4 Institutions that provide emergency response services and their designations.

Institution	Designation
Kenya Red Cross	Kenya Red Cross has an MOU with the county to provide ambulance services and to act as first responders. They have the following teams. Dispatch area team that receives calls, logistics department dealing with preparedness, Operations department service providers and Counseling department – (De briefing).
Kisii Refferal Hospital	Kisii Level 6 Hospital is the main hospital in Kisii county that deals with referrals in emergency cases they have the following staff who have different roles, they include; Nursing officers and Medical officers, trauma counselors, Public health officers, anaesthesiologists and surgeons.
St John Ambulance	They are working partners with the county in case of emergencies and they have Volunteers, doctors, nurses and trauma counselors.
Kenya Police	They have an understanding with the county to provide civil service, the police team in kisii county Administration Police, civil Police, traffic Police and GSU.
Kisii County (Disaster Management Department)	The fire tenders in the county are managed by the county department of Disaster Management. They have the following; Fire Brigade marshals, disaster management officers.

The researcher established that the institutions above have a working relationship with the county with different designations. They act as critical service support personnel who may be called upon to respond to emergencies including mass casualty incidents. Institutional heads have authority to designate support staff in their departments as critical services support to serve in an emergency.

An employee designated as critical services support is one whose job functions are vital to the operation of the facility, whose presence is required regardless of the existence of emergency conditions and whose absence from duty when an emergency occurs could endanger the safety and well being of the country population. If a position / function has been designated as critical services support, this means, in the event of an emergency, the position has been determined to be critical for support and recovery. (UCSD, 2014)

4.4.2 Roles played by the institutions in emergency response.

The researcher sought to establish the roles played by the different institutions in their capacity as Rapid Response Team members in emergency response. For the respondents to be able to respond to this, it was important for them to have been conversant with their roles in emergency management;

Table 4.5 Roles played by the institutions in emergency response.

Institution	**Roles**
Kenya Red Cross	1. Provision of Emergency Medical Care example in road traffic accidents. 2. Patient referral for definitive management to referral institutions. 3. Provision of professional medical education example first aid. 4. Provision of ambulance services.
Kisii Referral Hospital	1. Planning and resource mobilization. 2. Collaborating with other institutions in relation to health emergencies. 3. Receive casualties for further treatment.
St Johns Ambulance	1. Provide professional medical education example first aid training. 2. Patient referral for definitive management to referral institutions. 3. Trauma support and counseling

Kenya Police	1. Map the scene of the emergency. 2. Save guard life and property. 3. Remove dead bodies from the scene of the emergency. 4. Report writing for Insurance payment.
Kisii County (Disaster Management Department)	1. Fire safety and precaution. 2. Coordinate the other institutions to work together. 3. Report writing on the emergencies.

The researcher established that the institutions had clearly defined roles they were expected to play in the practice of triage. Carlin 2015 considers the following to be key service personnel in responding to emergency service incidents and he states the following as their roles and responsibilities;

Roles and responsibilities of the fire service attending an emergency services incident:

- Saving lives through search and rescue
- Fighting and preventing fire
- Rendering humanitarian services
- Detection, identification, monitoring and management of hazardous material
- Damage control and salvage
- Ensure that there is a return to normalcy in the shortest time possible

Roles and responsibilities of the police attending an emergency services incident:

- Saving of lives and working with other services on scene
- To secure the scene and preserve the evidence
- Setting up cordons
- Investigating the scene and securing evidence
- Collecting information on persons involved
- Preventing crime (looting, vandalism on scene)
- Providing family liaisons officers

Roles and responsibilities of the ambulance service attending an emergency medical incident:

- Stabilize the condition of any person injured at the scene
- Preservation of life
- Transporting the injured quickly and safely to the hospital
- Warning the hospital of expected time of arrival and informing them of the equipment that is needed

Role of the hospital (General practitioners) in the pre-hospital setting:

- Diagnosis and decision making
- Important medication could be started earlier

This is clear from the response below by a key informant;

"The presence of general practitioners in emergency medical care is perceived as improving patient care; they assist the other first responders with diagnosis and even come in handy in deciding the way the patient should be handled".

In connection to the roles played by the different institutions as rapid response teams / first responders, there needs to be a clear chain of command from the county and the county should have a committee comprising of the above institutions and any other that they might establish has capacity to conduct triage in mass casualty incidents. The committee should have specific roles and the members involved therein encouraged to sign MOUs to work together.

4.5 Analyzing structures and systems in place

Structures and systems in institutions provide guidance to all employees by laying out the official reporting relationships that govern the work flow of the company. Without a formal organizational structure, employees may find it difficult to know who to report to in different situations. It may become unclear exactly who has the final responsibility for what. Organizational structure improves operational efficiency by providing clarity to employees at all levels of a company (Ingram2011).

Table 4.6 Analyzing Structures and Systems in Place

Institution	Systems in place	Structure
Kenya Red Cross	Centralized dispatch system. 24 hour working EMS crew.	This is how Kenya Red Cross is structured; there is the head of emergency response, In the Kisii scenario the team leader reports to him who acts as Incident Commander if all the paramedics have convened in a mass casualty incident, there is a Kenya Red Cross coordinator who works hand in hand with the team leader and the emergency medical technicians/ paramedics who take direct orders from the team leader and volunteers who take orders from the branch coordinator and team leader liaison officer, In Kisii county the branch coordinator or team leader act as a communication officer
Kisii Referral Hospital	Kisii County Ambulance system.	Kisii Referral Hospital has the following structure that applies when receiving casualties at the hospital; There is the receiving area at the casualty ward, then rapid observation and observation is done, after prioritization and registration of patients, then the casualties are taken to the treatment area for major/ minor operation.
St John Ambulance	24 hour Ambulance services. Trauma support and counseling team.	In Kisii St John has a coordinator; there are medics who report directly to him and volunteers.

Kenya Police	None	The OCS is senior in Kisii county, then there is the deputy OCS then civil police, traffic police, administrative police who take orders from either the OCS or deputy OCS (orders within the law of Kenya).
Kisii County (Disaster Management Department)	Fire safety and precaution. Coordinate the other institutions to work together.	Director Disaster Management, after a Deputy Director who assumes command when the director is not in, then there are disaster management officers and fire brigade who take direct orders from the director or deputy director.

The researcher established that the institution's have structures and systems that they operate under. The researcher established that though they are structured and systems in place. They have different roles that they play in emergency response as RRTs. Thus the need for the county to come up with a single structure that incorporates all the RRTs. This is through drafting an incident command system in a contingency plan. For first responders ICS consists of a standard management hierarchy and procedures for managing temporary incident(s) of any size. ICS procedures should be pre-established and sanctioned by participating authorities, and personnel should be well-trained prior to an incident. (O'Neill, 2008).

He further on says, ICS includes procedures to select and form temporary management hierarchies to control funds, personnel, facilities, equipment, and communications. Personnel are assigned according to established standards and procedures previously sanctioned by participating authorities. ICS is a system designed to be used or applied from the time an incident occurs until the requirement for management and operations no longer exist. ICS is interdisciplinary and organizationally flexible to meet the following management challenges:

- Meets the needs of a jurisdiction to cope with incidents of any kind or complexity (i.e. it expands or contracts as needed).
- Allows personnel from a wide variety of agencies to meld rapidly into a common management structure with common terminology.
- Provide logistical and administrative support to operational staff.
- Be cost effective by avoiding duplication of efforts, and continuing overhead.
- Provide a unified, centrally authorized emergency organization

Figure 4.1 Equipment.

Given the developments in Kisii county and the number of the elements at risk, the county has two fire tenders as evidenced below.

Figure 4.2 Fire tenders in Kisii County

Hose pipe in one of the fire tenders.

Figure 4.3 Ambulances

The main ambulance service provider is Kenya Red Cross, who are contracted by the county. They have nine ambulances that are all in working condition and well equipped. Below is evidence of an ambulance and the way it's equipped. The ambulances have two radios that operate between a distance of 30-50 km (VHF) and the other one that can cover approximately 654km (UHF).

A Kenya Red Cross Ambulance the large antennae (black) supports the UHF radio and the silver one supports the VHF radio.

Figure 4.4 A photo showing the layout of an ambulance

The ambulance has an ECG machine, two stretchers one foldable one for transferring the casualty, IV fluids and other medication that can be used to stabilize a casualty, a first aid kit and an oxygen tank complete with its gear.

The respondents had knowledge of the structure of a working triage. But they had no triaging tags that the researcher established were yet to be sent from Nairobi. The implication of this is that if there is a mass casualty incident in Kisii County that required triaging. Then it might consume a lot of time trying to sort and to update a new team that arrives on the scene after the first respondents have done the sorting. The color codes are important not only for identifying the category that the casualties fall under, but also for determining the order in which they will be treated.

4.5.1 Institutions with a working agreement/ MOU.

A memorandum of understanding is a written agreement between two or more jurisdictions defining roles, responsibilities and reimbursement relating to emergency response and recovery (Lynch, 2007). Below is a table showing the institutions, who they work with in response and the type of agreement they have:

Table 4.7 Institutions with a working agreement/ MOU.

Institution	**Who they work with in response**	**Type of Agreement**
Kenya Red Cross	Kisii County (fire brigade), The police department, Kisii Referral Hospital.	MOU
Kisii Referral Hospital	Kenya Police, Kisii County (fire brigade), public works, st John Ambulance, Kenya Red Cross,	Adhoc basis (situational)
St John Ambulance	Kisii County (fire brigade),	Situational
Kenya Police	Kenya Red Cross, St John Ambulance, Kisii County (fire brigade),Kisii Referral Hospital	Situational
Kisii County (Disaster Management Department	Kisii County (fire brigade),Kenya Red Cross, St John Ambulance, Kenya Police	Kenya Red Cross (MOU). For the rest (situational)

The findings revealed that out of the selected Institutions, not all had a working agreement with each other. But they were aware that it was important to have a document that binds them together. Disaster response requires a working plan and it's a necessity that the key players work together, and have clearly defined roles. This can be done through a signed memorandum of understanding by all the key players. The role of the MOU will be to establish a formal working relationship between the Institutions.

The main role of a memorandum of understanding is to provide the possibility of mutual assistance. The implication of the findings is that its only one organization that has a binding agreement to respond to emergencies, while the rest of the institutions worked with each other on a situational basis. A situational working partnership implies that support is not promised and unity of effort will be weak. An MOU will promote a working relation and enable the institutions to pull their resources together for better response.

4.5.2 Set response time for the following emergencies.

To make that difference as to whether someone lives or dies, whether temporarily injured or maimed for life or whether they lose their home or other valued possessions then response time is relevant. (Wrack, 2012). He further states that response time matters, because people and their lives matter. In the strength of the above, the researcher sought to find out if the Institutions that act as first responders in Kisii County had set response time for selected emergencies. Below are the findings:

Table 4.8 Set response time for the following emergencies.

Institution	Emergencies	Response Time
Kenya Red Cross	Fire incidents	10 min
	Road Traffic Accidents	10 min
	Stampedes	10 min
	Explosions	10 min
	Bomb threats	10 min
Kisii Referral Hospital	Fire incidents	Not set

	Road Traffic Accidents Stampedes Explosions Bomb threats	
St John Ambulance	Fire incidents Road Traffic Accidents Stampedes Explosions Bomb threats	Not set
Kenya Police	Fire incidents Road Traffic Accidents Stampedes Explosions Bomb threats	Not set
Kisii County (Disaster Management Department	Fire incidents Road Traffic Accidents Stampedes Explosions Bomb threats	Not set

The researcher established that only one institution had set time for responding to emergencies. This indicates that in terms of preparedness they have gone a long way in setting time guidelines that will go a long way in influencing how they respond to emergencies and the outcome that they are expected to achieve. The other Institutions that haven't set a time guideline could be an indication that they haven't seen the importance of setting time in terms of response or they assume that they will be able to respond as first as they can. This will put more lives at risk, extend the damage on property, it could lead to more deaths if the response is not prompt. That's in the case of casualties that would otherwise have been saved. It even poses a danger to planning in that it might take a longer time than necessary and in emergency response that could cause more damage.

4.6 Examine The Practice Of Disaster Triage.

The practice of disaster triage that is used in mass casualty incidents has standard operating procedures. These procedures must be adhered to in order to make this practice of triage a success. The American Heritage Dictionary defines disaster triage as a process of sorting injured people into groups based on their need for or likely benefit from immediate treatment. Triage is used at disaster sites, when limited medical resources must be allocated.

Since the practice of triage is applied mainly in case of mass casualty incidents by RRTs, the researcher sought to establish if the respondents were aware of what the practice of triage is and how to apply it in case of mass casualty incidents. There is no limit on the age or gender of a rapid response team member. But training in the field of emergency medical services is a requirement for one to be in a position to practice as a paramedic. In the training triaging is extensively covered, but it doesn't mean that we assume that all those who go through this training can comfortably practice triage on the scene of a disaster. In order to establish the knowledge of the practice of triage by the respondents, the researcher sought to know if the respondents had ever heard of a medical triage. The findings are as presented below:

4.6.1 Medical Triage Knowhow

All the respondents had ever heard of a medical triage and could define what it was. This indicates that the respondents were aware of what a medical triage is.

When used in healthcare and medicine the term triage refers to a sorting of injured or sick people according to their need for emergency medical attention. It's used to determine priority of who gets care first. (Torrey, 2014). She goes ahead to state that triage systems run gamut from verbal shouting in an unusual emergency to well defined color tagging systems used by soldiers and EMTs when they arrive on the scene of a mass casualty incident. A key informant had the following to say about the structure of a disaster/ medical triage:

We respond by receiving dispatch calls, the first unit to arrive on the scene assumes incident command, depending on the supplies we have we begin the evaluation process that is triaging.

4.6.2 Participation in triage

The total respondents said that they had participated in the practice of triage. This indicates that out of the 9 units of the 18 emergency medical technicians in Kisii County that whatever unit arrived at the scene of a mass casualty incident could assume incident command because they have participated in one and can begin the initial triaging as they await the rest of the units and other rapid response team members. Since they have had prior experience in triaging, it means that they can decide who is most urgently in need of transportation into a hospital for care (generally those who have a chance of survival but would die without immediate treatment) and whose injuries are less severe and must wait for medical care.

4.6.3 Sorting of victims on the scene of accident

After establishing if the respondents were aware of what a medical/disaster triage was and if they had ever participated in one. The researcher further asked them why sorting was mainly done on the scene of the incident. The respondents were aware of the importance of sorting the victims on the scene of the incident. It's in order to sort victims into those who need critical attention and immediate transportation to the hospital. This indicates that the respondents were well aware of the importance of sorting and identifying the victims from the scene of the incident.

Owens, 2008 states that sorting is used to assist in mass casualty management. Its designed to provide primary and secondary triage. The primary triage is the triage sieve during which providers quickly sort casualties into groups based on priority of treatment need. The second step, triage sort, is a more in-depth assessment. Victims are categorized based not only on injuries but also according to available resources for on scene treatment and transport. Assessment is first based on the ability to walk and then assessment of the airway and then adequate treatment given.

4.6.4 What steps to take when some victims are in a stable condition

The researcher sought to find out what action the first responders would take in the eventuality that some victims of an incident were in a stable condition. The responders had the following choices to select from; option a) you avoid evacuating them to the surgical unit, b) Evacuate to surgical units, c) Postpone the evacuation and wait for him or her to complain of any pains d) Postpone the evacuation but continue monitoring in case there is need to evacuate to the surgical units. Out of the choices the responders were presented with their was only one correct option that was d) to postpone the evacuation but continue monitoring in case there is need to evacuate to medical facilities. The table below represents a summary of the findings:

Table 4.9 showing the action the first responders would take.

Steps to take when some victims are stable	**Frequency**	**Percentage**
Evacuate to surgical units	3	16.67
Postpone the evacuation but continue monitoring in case there is need to evacuate to the surgical units	15	83.33
Total	18	100

Out of the total respondents, majority of the respondents 83.33 percent said they would postpone the evacuation but continue monitoring in case there is need to evacuate to the surgical unit, 16.67 percent said they would still evacuate the victims to the surgical unit. No respondent however said that they would take no specific action or wait for the victim to complain for them to take a step. This indicated that the majority 83.33 percent were aware of the right step that they were required to take that is to postpone the evacuation and give the immediate cases priority but continue monitoring them. The 16.67 percent of the respondents who said they would evacuate to surgical units indicated that a percentage of the paramedics did not understand that the walking injured (those in a stable condition), were not to be given first priority, because the injuries were minor. If

these paramedics were to be in charge of triaging, then they would most likely even transport those casualties in a stable condition to the hospital. Leading to more damage on the immediate cases and even death where it all would have been prevented in proper triaging.

4.6.5 The first rule in organizing field triage

The respondents were asked the first rule in organizing a field triage. The researcher presented them with the following options to select from; a) Operate in any given conditions to save lives b) The site should be reasonably safe c) Operate as instructed by the team leaderd) Identify the victims and classify them. Out of the four options, one was correct that is b) the site should be reasonably safe. The responses they gave are summarized in the table below:

Table 4.10 showing what the respondents considered the first rule in organizing field triage.

Responses	Frequency	Percentage
The site should be reasonably safe	15	83.33
Operate as instructed by the team leader	1	5.57
Identify the victims and classify them	2	11.10
Total	18	100

The study findings indicated that the majority 83.33 percent considered the first rule in a field triage to be safety, 5.57 percent considered the first rule as operating as instructed by the team leader and 11.10 percent, said the first rule was to identify the victims and classify them. This indicate that 83.33 percent of the respondents knew the first rule in organizing field triage and were in a position to protect themselves and the victims from any further damage as compared to the 16.67 percent, who would ignore the safety

measure first and probably endanger themselves and the casualties more. The implication of the 16.67 percent who did not choose the correct option are likely to cause more damage to the injured and to themselves, because the scene of the incident could be having some toxic material.

A key informant had the following to say:

"Safety is the first rule when we are conducting triage; take an example of a building that collapsed halfway. As we begin rescuing the casualties, we move the casualties to the lower floors that were not affected to begin triaging. What if the rest of the building collapses in on us? That's why scene safety is the first rule".

The first unit on the scene does scene assessment. Scene priorities include the following; protect yourself and your team members first, protect the public, protect the patients and then protect the environment. (Owen, 2008)

4.6.6 Step to take when you have mass casualties

The respondents were asked what they would do if they had many casualties. The responses were as seen in the table below

Table 4.11 First step to take when one has mass casualties

Responses	Frequency	Percentage
Sort them out to determine the order in which they will be evacuated to medical facilities	14	77.78
Use ambulances to evacuate them to the hospital	1	5.56
Inform the government authorities that you are overwhelmed and wait for instructions	2	11.10
Commence immediate treatment with whatever resources that are available	1	5.56
Total	18	100

The table above shows what the respondents considered to be the first step to take in a mass casualty incident. Out the total respondents the majority 77.78 percent said that they would sort them out to determine the order in which they are to be evacuated to the hospital. This is the correct choice it indicates that the majority of the response team members were aware that a mass casualty incident put a lot of weight on the equipment, resources and personnel that is available. Thus the most important thing is to sort the casualties in the order in which they will receive treatment and the cases that are not immediate and urgent can wait.

The rest 22.22 percent indicated they use ambulances to transport them to the hospital, inform the government authorities or commence immediate treatment. This implies that there will be delays and delays are not good where there are casualties. Using ambulances without sorting would mean that the casualties be transported in any order, in the process of doing that the people who required urgent treatment and are left behind to wait can die in the process and the hospital facilities may be overwhelmed, with cases that didn't require immediate evacuation to the health facilities. It will be perceived as ignorance and carelessness for emergency response team members to commence immediate treatment of the casualties without sorting them out. That's a step that should be taken after sorting. Informing the government authorities is not right, first sort, then begin treatment and if there is need for backup then the communications officer can inform the government.

4.6.7 The correct pool for sorting mass casualties

After the respondents were asked to state the first thing they would do when faced with mass casualties which is sorting, they then were asked to select the correct category of pools for sorting mass casualties. Their responses are summed up in the table below:

Table 4.12 The correct pool for sorting mass casualties

Responses	Frequency	Percentage
a	16	88.89
b	2	11.11
Total	18	100

The respondents were presented with two different categories and were asked to select the correct pool for sorting mass casualties. The majority 88.89 percent selected the correct pool that was a). i. Green Tag – lightly injured able to manage for themselves, ii. Pool 2 Yellow Tag - lightly injured, requiring assessment and treatment which can be provided on spot or in the emergency room iii. Pool 3 Red Tag – requiring assessment and surgical intervention IV. Pool 4 BlackTag – dead/wounded who will not survive the injury. This indicates that majority of the respondents 88.89 percent were aware of the correct steps to take in sorting out mass casualties. If faced with mass casualties they would be in a position to sort the victims out correctly.

4.6.8 Decision maker in sorting out the victims in an emergency scene

After the respondents identified the category of pools they considered correct in triage sorting. They then were asked to say who made the decisions in sorting out the victims in an emergency scene. Their responses were as seen below

Table 4.13 Decision maker in sorting out the victims in an emergency scene

Responses	Frequency	Percentage
Any qualified personnel in the field	13	72.22
Team leader	4	22.22
Using guidelines of a the contingency plan	1	5.56
Total	18	100

Out of the total respondents only 5.56 percent of the respondents selected the correct option which is using guidelines of a contingency plan. While the majority 72.22 percent said any qualified personnel in the field would make the decisions, while 22.22 percent said that the decisions would be made by a team leader. This response indicates that only 5.56 percent of the respondents were aware of a contingency plan and that in the plan then there is a clear layout on who is responsible for what. The contingency plan focuses on the recovery after a disaster and draws the boundaries for each response team. The

majority94.44 percent of the respondents said that any qualified person in the field would make the decisions and a part of those said the team leader makes the decisions. Yes a team leader is the one who assumes incident command when all the units are on the site and the first unit to arrive on the scene of the incident starts the triage process. But the correct order on how all this is done is all stipulated in the contingency plan plus the recovery strategy.

IFRC defines a contingency plan as one that aims to prepare an organization to respond well to an emergency and its potential humanitarian impact. Developing a contingency plan involves making decisions in advance about the management of human and financial resources, coordination and communications procedures, and being aware of a range of technical and logistical responses. Such planning is a management tool, involving all sectors, which can help ensure timely and effective provision of humanitarian aid to those most in need when a disaster occurs. Time spent in contingency planning equals time saved when a disaster occurs. Effective contingency planning should lead to timely and effective disaster-relief operations.

The contingency planning process can basically be broken down into three simple questions:

- What is going to happen?
- What are we going to do about it?
- What can we do ahead of time to get prepared?

Contingency planning is most often undertaken when there is a specific threat or hazard; exactly how that threat will actually impact is unknown. Developing scenarios is a good way of thinking through the possible impacts. On the basis of sensible scenarios it is possible to develop a plan that sets out the scale of the response and the resources needed. (IFRC, 2013)

Table 4.14 Identification and sorting out of injured at the emergency scene

Responses	Frequency	Percentage
They are identified by the team leader	1	5.56
They are interviewed then the information is used to determine the extent of the injury	2	11.11
They are labeled with standardized cards which are prepared in advance and familiar to all personnel	15	83.33
Total	18	100

When asked to choose how they knew the injured were sorted out and identified at the emergency scene, majority of the respondents 83.33 percent said that they were labeled by standardized cards which were prepared in advance and familiar to all personnel including the surgical unit, then 11.11 percent said that the casualties were interviewed and the information they gave was used to determine the extent of the injury while 5.56 percent of the respondents said that they were identified by the team leader. The response indicates that the majority 83.33 percent of the respondents knew that sorting and identification of the casualties was through labeling with standardized cards that are prepared in advance and familiar to all personnel. The interview option is wrong because you cannot conduct interviews on unconscious casualties and some of them may be disillutional, so it is best to sort them and label them with standardized cards, then interview those that are lightly injured. The figure below shows a sample of a triage tag used in Kenya.

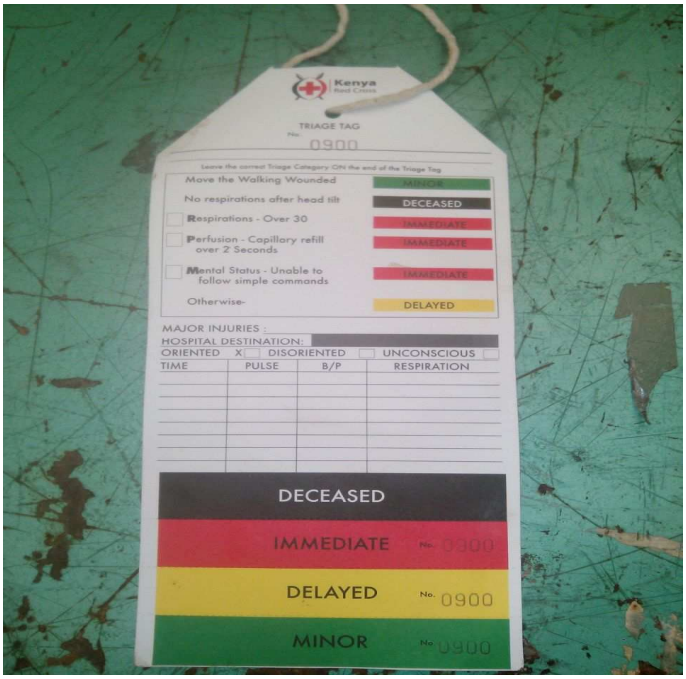


Figure 4.5 A triage standardized card.

Most triage systems use standardized cards with color codes as seen above.Below is a brief description of what each color represents;

- **Red:** needs immediate attention - critical life-threatening injury or illness; transport first for medical help
- **yellow:** serious injuries needing immediate attention. In some systems, yellow tags are transported first because they have a better chance of recovery than red-tagged patients.
- **green:** less serious or minor injuries, non-life-threatening, delayed transport; will eventually need help but can wait for others
- **black:** deceased or mortally wounded

A respondent had the following to say

"The triage tag/card is tied around the wrist of a casualty with the right colour code. The card has perforations on each color. All emergency medical technicians are supposed to know what each stand for".

4.6.9 Importance of establishing a channel of communication from the scene if the incident to the hospital

The respondents were asked to choose the goals they felt establishing of a reliable channel of communication between the spot where the accident has occurred to the hospital achieved;

Table 4.15 Importance of establishing a channel of communication from the scene if the incident to the hospital

Respondents	Frequency	Percentage
a	4	22.22
c	14	77.78
Total	**18**	**100**

Majority of the respondents 77.78 percent said that a clear channel of communication between the scene of the incident and the hospital is important in order to save lives, save time and for ease of treatment, while 22.22 percent said a clear channel of communication from the scene to the hospital was important to announce the arrival of casualties, their number and type and the type of the injuries and check on the capacity of the hospital. The response indicates that only 22.22 percent of the respondents knew the main goal of establishing a clear channel of communication between the incident scene and the hospital. The majority 77.78 indicated the importance of triaging. It could be that disaster communication is not emphasized in emergency medical training, or much emphasis is placed on life saving, that the EMTs assume that the only goal to meet at the end of the day.

Table 4.16 The most important rules to follow when responding to emergencies

Responses	Frequency	Percentage
Identify the injured, sort them and treat them according to the extent of damage	6	33.33
It must be carried out by competent and experienced personnel	12	66.67
Total	**18**	**100**

The researcher asked the respondents what they knew as the most important rules when responding to emergencies. Majority of the respondents 66.67 percent said that the most important rules to follow in emergency response was that it had to be carried out by competent and experienced persons while 33.33 percent of the respondents said the most important rule in emergency response was to identify the injured, sort them and treat them according to the extent of the damage. It's therefore an indication that 66.67 percent of the respondents were aware that the most important rule in emergency response was that it had to be conducted by qualified and experienced personnel. It could show why smaller percentages were aware of the rules being outlined in a contingency plan.

4.6.10 Practiced drills in emergency response

The respondents were asked if they have ever practiced drills in emergency response. The responses are as summarized in the table below;

Table 4.17 Practiced drills in emergency response

Responses	Frequency	Percentage
Yes	14	77.78
No	4	22.22
Total	**18**	**100**

The researcher established that majority of the respondents 77.78 percent of the respondents had ever participated in emergency drills, while 22.22 percent of the

respondents had never participated in emergency response drills. This indicates that 77.78 percent of the respondents had practiced different approaches to different disasters in terms of response. The 22.22 percent of those that had not participated in emergency drills were fresh recruits. For the last drill they had was more than a year ago.

Table 4.18 Dealing with mass casualty incidences in the last one year

Responses	Frequency	Percentage
Yes	14	77.78
No	4	22.22
Total	18	100

The respondents were asked if they had ever dealt with mass casualty incidents the past year. A large percentage 77.78 indicated that they had dealt with mass casualty incidents in the past one year, while 22.22 percent said they had dealt with mass casualty incidents in the past one year. This indicates that 77.78 percent of the respondents have had recent field experience. This is why drills should be conducted regularly to keep the RRTs ready for any mass casualty incident.

4.6.11 Challenges faced when dealing with mass casualties

The researcher sought to find out what the respondents thought would be the major challenges in dealing with mass casualties. The following challenges were listed;

- Rowdy and angry community mobs
- Shortage of supplies/ equipment
- Poor directions given to the RRTs
- Delay in presence of the police
- Poor coordination of rapid response teams
- Inadequate emergency infrastructure (ICU)
- Poor roads that make access to casualties difficult
- Shortage of trained staff in handling mass casualties

The above factors could affect the outcome of the practice of triage and rapid response.

4.6.12 Suggestions on what should be done to improve mass casualty response in Kisii County

The respondents were asked to give suggestions on what they thought should be done to improve responses to mass casualty incidents in Kisii County. They gave the following suggestions;

- Develop working agreements and MOUs, with other organizations providing emergency services
- Advance planning and training of emergency response teams
- Carry out regular drills on disaster triage to improve on skills
- Community education in Mass Casualty Incidents
- Need to have a warehouse monitored by logistics officers.
- Receiving facilities to be trained on how to prepare early for any mass casualty incidents
- Training staff on triage
- Avail/ set aside resources to deal with emergencies
- To establish/ set protocols that are acceptable to all parties responding to emergencies. Example the police, fire brigade and ambulance.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the main findings of the study, including the main conclusions and recommendations derived from the findings of the study. The findings were based on interview schedules and direct observation. Both the interviews and observation were held in line with the objectives of the study. The data was analyzed by using excel. Frequency tables were used to describe the data and draw a summary of the.

The main objective of this research was to establish if there is a practice of disaster triage in Kisii County. In specific the research sought to establish the existence of Rapid Response Teams in kisii, to analyze their structures and systems of these Rapid Response Teams and finally to examine their practice of Disaster Triage by the Kisii Rapid Response Teams.

On establishing the existence of Rapid Response Team, the study revealed that they have different roles that they are expected to play in terms of response in mass casualty incidents as follows; the police map the scene of the emergency, safeguard life and property, remove dead bodies from the scene of the incident and contribute in report writing for insurance payment, Kenya Red Cross provide emergency medical care example in road traffic accidents, patient referral for definitive management, provision of professional medical education example first aid and provision of ambulance services. St John Ambulance would provide professional medical education, patient referral for definitive management and trauma support and counseling. Kisii Referral Hospital was in a position to help with planning and resource mobilization, receive casualties for further treatment and the Kisii County (Disaster management department). Provided fire brigade services and mobilizing of the institutions.

Worth noting is that the county does not have an ambulance service of its own and therefore it subcontracted Kenya Red Cross to provide ambulance services and to act as first responders. According to UNIDO, subcontracting is an economic relationship where one entity (the main contractor) requests another independent entity (the subcontractor) to undertake the production of parts, components, sub-assemblies or the provision of additional services that are necessary for the completion of the main contractor's final product, always in accordance with the main contractor's specifications (UNIDO, 2003). Subcontracts contain special terms and conditions that are unique to the prime contract, and flow-down provisions that proceed from it. The incentive to hire subcontractors is either to reduce costs or to mitigate project risks. In this way the general contractor could have provided by itself, at lower overall risk. The implication of subcontracting for crucial services like ambulance services is that in case there was breach of contract and Kenya Red Cross withdraws its services or they got a better offer than what the prime contractor here in Kisii County is offering them and they cancelled the contract and then an emergency occurs. Then there won't be any ambulances and paramedics to provide emergency medical services in the county as it is today. Thus leading to more deaths and a worse outcome on the injured example if the paramedics are on site and some casualties have minor fractures that if attended to immediately can prevent disability and in this case they are not there at all. Then the damage cannot be controlled.

Given that in the contractual agreement the party operating the ambulances is Kenya Red Cross, it still pauses a danger in emergency response if they decided to suddenly withdraw their services to the county. It is always advantageous to have your own facility especially ambulances and paramedics because of reliability and for better response in case an emergency occurs in the county.

In regard to structures and systems of the Rapid Response Teams in Kisii County; the study established that the institutions had structures and systems that they operated under. Though they have well defined internal structures and systems, their roles as first responders differed as referred to in the findings of the first objective. According to Ingram (2011), structures and systems in institutions provide guidance to all employees

by laying out the official reporting relationships that govern the work flow of the company. Without a formal organizational structure, employees may find it difficult to know who to report to in different situations. Organizational structure improves operational efficiency by providing clarity to employees at all levels of a company.

The study however notes that, there is need for the county to formulate a structure that encompasses the institutions who act as first responders and come up with systems that are tailored to suit emergency response. That is through forming a committee that considers all the key players in emergency response and developing a specific structure with roles for each member. This is through drafting an incident command system and training of personnel to best suit this position.

Further established is that the county had equipment that would come in handy in carrying out the practice of disaster triage. Given the developments in Kisii County and the number of the elements of risk, the county has two fire tenders directly under the supervision of the county office and nine ambulances subcontracted from Kenya Red Cross one located at each Sub-County's main hospital.

The findings revealed that not all institutions signed an MOU to work together. But rather had a situational working relationship. The main role of a memorandum of understanding is to provide the possibility off mutual assistance.
Hence from the findings of the above objective, the institutions have internal structures and systems that they operate under. But need to formulate one that creates a working system and structure for all of them.

As for the practice of Disaster Triage in Kisii County, it was established that all the respondents knew the basics of a disaster triage that it was a process of sorting casualties in order of the extent of their injuries in mass casualty incidents to do the most good for all. Among the RRTS there are the paramedics/ EMTs who sort the casualties and begin initial treatment. It was established that out of the 9 units (ambulances) that the total emergency medical technicians worked with. The EMTs had on one occasion or another

participated in the practice of triage, not specifically in Kisii County but in other areas in Kenya. It's an indication that whatever unit arrived at the scene of mass casualty incident they could assume incident command until the team leader got on site.

In case of a mass casualty incident, it's not given that all the casualties will be in vegetable state or in a poorly state. Some might be lightly injured and well coordinated; they are termed to be in a stable condition. The researcher asked the respondents what they would do in case some of the casualties were in a stable condition. A large percentage of them selected the correct option. That is they would postpone the evacuation but continue monitoring in case there is need to evacuate to the surgical unit (83.33 percent and 16.67 percent said that they would anyway evacuate them to the surgical units. The researcher further on wanted to know what the emergency medical technicians considered the first rule in organizing field triage. The first rule is that the site should be reasonably safe. Out of the total respondents 83.33 percent selected the most suitable answer, while the rest, 5.57 percent said they would operate as instructed by the team leader and 11.10 percent stated that they would identify and classify the casualties.

In addition to the above, Disaster Triage/medical triage involves color codes. Because of the magnitude of the casualties, they are tagged, according to the extent of injury they suffered. Green tag represents lightly injured but able to manage for themselves, Yellow tag- lightly injured, requiring assessment and treatment. Red tag- requiring assessment and surgical intervention. Black Tag- Dead/ wounded who will not survive the injury. Majority of the respondents 88.89 percent were aware of the correct tagging process/color coding while the rest 11.11 percent were not aware of this.

It was noted that not all respondents had participated in drill exercises 77.78 percent of the respondents had participated in drills, while 22.22 percent had not. Smith (2012) defines a drill as a practice of something associated with an institutions' emergency plan. He gives the following reasons as to why he considers it necessary for institutions' to do a drill exercise; because it's a requirement, to test your plan to see if your plan or part of

it is complete enough, to build the relationships you will use during a real disaster, to expose leaks, test perspectives and give confidence for what to do

However the field of emergency response is not short of challenges. The respondents identified the following challenges when dealing with mass casualty incidents, rowdy and community mobs, shortage of supplies/equipment, poor direction given to the first responders, delay in the presence of the police. Poor coordination of the RRTS, inadequate emergency infrastructure, poor roads and shortage of trained staff in handling mass casualty incidents. The above factors could affect the outcome of the practice of triage and rapid response.

5.2 Conclusions

From the findings it can be concluded that, there are rapid response teams in Kisii County. With different roles that they are expected to play in case of a mass casualty incident depending on the institution that they work for as follows; the police are entirely responsible for securing the scene of the incident, KRC and St. John Ambulance provide emergency medical services. The hospital may come in support provision of medical services and are at the receiving end of the casualties and there is the fire brigade that puts off the fires and any other roles as assigned by the incident commander. Although their roles are well defined, there is need for advanced training on first aid by the first respondents. Given that the county has not experienced emergencies that produce many mass casualties. The first respondents are out of practice. It also explains why some institutions that are supposed to provide ambulance services have no ambulance units and why they do not allocate funds for regular drills.

These institutions have structures and systems that they operate under. What they lacked was a structure that involves all the institutions who act as first responses in case a mass casualty was to occur. But it would not be possible to have one structure or a working system if they had no working relation. It’s only KRC that has an official working relationship with the county. So there is need for the county to formulate a contingency

plan considering all the stakeholders and to foster a working relationship among these institutions.

Though there are paramedics /EMTs who are responsible for conducting disasters triage in mass casualty incidents. There is need for them to go through regular drills and trainings to expose them to different scenarios that may require their response. Majority of the paramedics 83.33 percent knew that they were meant to postpone evacuation if some casualties were in a stable condition, while the rest 16.67 percent said they would evacuate them immediately. It shows the importance of regular trainings and examinations of this first respondent.

5.3 Recommendations

From the findings of the study, the following recommendations were made.

1. The county should conduct an official audit on the equipment and personnel that each institution has that can come in handy incase of an emergency.
2. Though having been trained in emergency response the paramedics/EMT's need to be re-trained regularly by conducting drills and examination through identifying a knowledge gap to keep them well versed with their work.
3. Even after the audit on equipment and personnel. A working relationship should be encouraged among the institutions that respond to emergencies. This is through developing working agreements and MOUs.
4. Response time should be set on different disaster scenarios in line with the response strategies of the institutions that act as first responders.
5. Receiving facilities should be trained on how to prepare early for any mass casualty incidents
6. Given the nature of a disaster that produces mass casualties, there is need for training on triage of specialized people who can work hand in hand with the paramedics/EMTS
7. The county should have its own ambulance service to avoid inconveniences if the subcontracted parties decided to suddenly cancel the contract.
8. The county should have its own paramedics accountable to it.

5.4 Suggested areas for further study

1. Triage monitoring and treatment of mass casualty events in emergencies
2. Medical response planning and triage for mass casualty RTAs
3. Preparedness and response to a rural mass casualty incident
4. Challenges of mobilizing resources for disaster response within local governments
5. Hospital preparedness for mass casualties

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Appendix i: Interview schedule for key respondents (director disaster management)

Introduction

My name is Lena Moraa Obara; I am currently pursuing a Masters of Arts Degree in Advanced Disaster Management at the University of Nairobi. In partial fulfilment for the award of a Masters Degree, I am required to submit a research paper in my area of interest which is **Institutional capacity to conduct Disaster Triage in Mass Casualty Incidents**: A case study of Kisii County. You have been selected to participate in this study and requested to give your honest response to the following questions. The information obtained from this study will be used purely for academic purposes and will be treated in confidence. Your assistance will be highly appreciated.

Date of Interview:

…….

Demographic Data

1. Name of Institution……
2. Age

   ……
3. Gender……
4. Level of Education (Tick one)

a)Certificate b) Diploma ☐ c) Degree ☐ d) Post graduate ☐

Establishing the existence of Rapid Response Teams.

5. Who are the key players in Emergency Management in Kisii County?

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6. What roles do they play incase of an emergency?

Organization	Role

Analyzing the structures and systems in place.

7. Does the country have any systems for emergency management in place?

Yes ☐ No ☐

a. If yes what kinds of systems have been set aside in responding to emergencies?

……

……

8. Does the county have any specific structures that are meant to deal with Mass Casualties?

Yes ☐ No ☐

9. If yes who are the key players/Institutions involved in emergency management and what are their

roles?

Organization	**Role**

10. Are these key players constituted into Rapid Response Teams?

Yes ☐ No ☐

11. What are the forms of engagement do you have with the team members (is it by contract or

goodwill)?

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……

……

12. If yes to question 10 above, what is the set response time for the following emergencies?

Emergencies	Response Time
Fire incidents	
Road Traffic Accidents	
stampedes	
Explosions	
Bomb Threats	

Examining the practice of Disaster Triage

13. Are you aware of a Disaster/ Medical Triage?

Yes No ☐

14. If yes, is it set up in Kisii County?

……

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15. How is it structured?

……

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……

16. Who are the key players in the triage set up and what are their roles?

Organization	Role

17. What response gear (equipments) do you have as a county?

a). ☐

b). ☐

c). ☐

d). ☐

e). ☐

f). ☐

18. Have you ever dealt with mass casualty incidences in the last one year?

Yes ☐ No ☐

19. If yes what will you say are the major challenges are you are faced with as a county in dealing with mass casualties?

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15. Kindly give suggestion on what should be done to improve responses to mass casualties in the county.

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……

Appendix ii: Interview schedule for key respondents (St Johns Ambulance, Kenya Red Cross, Kenya Police, Nursing services Manager)

Introduction

My name is Lena Moraa Obara; I am currently pursuing a Masters of Arts Degree in Advanced Disaster Management at the University of Nairobi. In partial fulfillment for the award of a Masters Degree, I am required to submit a research paper in my area of interest which is **Institutional capacity to conduct Disaster Triage in Mass Casualty Incidents**: A case study of Kisii County. You have been selected to participate in this study and requested to give your honest response to the following questions. The information obtained from this study will be used purely for academic purposes and will be treated in confidence. Your assistance will be highly appreciated.

Date of Interview:

…….

Demographic Data

1. Name of Institution…….
2. Age

   ……
3. Gender……
4. Level of Education (Tick one)

a) Certificate ☐ b) Diploma☐ c) Degree☐ d) Post graduate☐

Establishing the existence of Rapid Response Teams

5. Do you have any teams set aside for emergency management?

   Yes ☐ No ☐

6. If yes what are their designations.

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7. As an organization what is your specific role(s) in responding to emergencies in Kisii County?

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Analyzing the structures and systems in place.

8. Do you have any systems for emergency management in place?

Yes ☐ No ☐

9. If yes what kinds of systems have been set aside in responding to emergencies?

……

……

……

10. Does your Institution have any specific structures that are meant to deal with Mass Casualties?

Yes ☐ No ☐

11. Who are the other institutions that you have agreements/ MOU's to work with in case of Emergencies?

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12. Are you constituted into Rapid Response Teams?

Yes ☐ No ☐

13. If yes what is the set response time for the following emergencies?

Emergencies	Response Time
Fire incidents	
Road Traffic Accidents	
Stampedes	
Explosions	
Bomb Threats	

Examining the practice of Disaster Triage

14. Are you aware of a Disaster/ Medical Triage?

Yes ☐ No ☐

15. If yes, is the system set up in your Institution?

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16. What are the details of the structure?

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17. Do you work under a team leader?

Yes ☐ No ☐

18. What are the qualifications of your team members?

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19. What response gear /equipment do you have as an Institution?

a).

b).

c).

d).

e).

f).

20. Have you ever conducted any drill in Disaster Triage?

Yes ☐ No ☐

21. If yes when was it conducted?

……

22. Have you ever dealt with mass casualty incidences in the last one year?

Yes ☐ No ☐

23. If yes what will you say are the major challenges are you are faced with as an Institution in dealing with mass casualties?

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24. Kindly give suggestion on what should be done to improve responses to mass casualties in Kisii County.

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Appendix iii: Interview Schedule for Paramedics

Introduction

My name is Lena Moraa Obara; I am currently pursuing a Masters of Arts Degree in Advanced Disaster Management at the University of Nairobi. In partial fulfillment for the award of a Masters Degree, I am required to submit a research paper in my area of interest which is **Institutional capacity to conduct Disaster Triage in Mass Casualty Incidents**: A case study of Kisii County. You have been selected to participate in this study and requested to give your honest response to the following questions. The information obtained from this study will be used purely for academic purposes and will be treated in confidence. Your assistance will be highly appreciated.

Date of Interview:

…….

Demographic Data

1. Name of Institution……
2. Age

   ……
3. Gender……
4. Level of Education (Tick one)

a)Certificate ☐ b) Diploma ☐ c) Degree ☐ d) Post graduate ☐

Knowledge of the practice of triage.

5. Have ever heard of a medical triage:

Yes ☐ No ☐ **if yes proceed to question 6. If no proceed to question 22**

6. If yes have you ever participated in one?

Yes ☐ No ☐

7. Sorting of victims is done on the scene of an accident for mainly one of the following purposes? (Choose one)

a) Because that is the place where the accident occurred.

b) For easy identification of the victims and transportation.

c) In order to sort victims into those who need critical attention and immediate transportation to the hospital and those with less serious injuries.
d) Because there is the presence of police and medical personnel on the site.

8. When you arrive at the scene of an accident/emergency and find that some people are in a stable condition, what do you do? (Choose one)
a) You avoid evacuating them to the surgical unit.
b) Evacuate to surgical units.
c) Postpone evacuation and wait for him or her to complain of any pains.
d) Postpone the evacuation but continue monitoring in case there is need to evacuate to the surgical units.

9. What is the first rule in organizing field triage? (Choose one)
a) Operate in any given conditions to save lives.
b) The site should be reasonably safe.
c) Operate as instructed by team leader.
d) Identify the victims and classify them.

10. What do you do when you have many casualties at once? (Choose one)
a) Sort them out to determine the order in which they will be evacuated to medical facilities.
b) Use ambulances and other available means to transport them to the hospital.
c) Inform the government authorities that you are overwhelmed and wait for further instructions from them.
d) Commence immediate treatment with whatever resources are available.

11. In case you find some of the victims in stable condition what would you do? (Choose one)
a) Discharge them and release them to go home.
b) Make them stay within the accident scene, to ensure that no complication arises thereafter.

c) Not take any action, because they are not injured.

d) In the triage area, those casualties should be re examined periodically and if in the hospital they should be re examined regularly.

12. In the categories below; which is the correct pool for sorting mass casualties ;(choose one)

a) I. Pool 1 (Green Tag) - Lightly injured, able to manage for themselves.

ii. Pool 2 (Yellow Tag) –Lightly injured, requiring assessment and treatment which can be provided on spot or emergency room.

iii. Pool 3 (Red Tag) - Requiring assessment and surgical intervention.

iv. Pool 3 (Black Tag) - wounded who will not survive the injury.

b) i. Pool 1 – Dead/ wounded who will not survive the injury.

ii. Pool 2 -Requiring assessment and surgical intervention.

iii. Pool 3-Requiring assessment and treatment which can be provided on spot or emergency room.

iv. Pool 4- Lightly injured able to manage for themselves.

c) None of the above.

13. Who makes the decisions in sorting out the victims in an emergency scene? (Choose one)

a) The decisions are made on the field by any qualified personnel present.

b) The decisions are made by the team leader.

c) All procedures and responsibilities are defined in advance in a contingency plan for receiving large numbers of casualties.

14. How are the injured identified and sorted out at the emergency scene? (Choose one)

a) They are identified by the team leader who is the most qualified of them all.

b) They are interviewed then the information that they provide is used to determine the extent of the injury.

c) They are labelled with standardized cards which are prepared in advance and familiar to all personnel including the surgical unit.

15. The establishment of a reliable channel of communication between the spot where the accident has occurred to the hospital achieves the following goals ;(choose one)

a) i. Announce the arrival of casualties, their number and the types of injuries.
   ii. Find out how many casualties the hospital is unable to care for and establish where there are several surgical units that can be used.

b) For easy access of the hospital facilities.

c) In order to save lives, save time and for ease in treatment.

16. Which are the most important rules to follow when responding to emergencies? (Choose one)

a) Identify the injured, sort them and treat them according to the extent of damage.

b) There should be equipment that is in working condition and qualified personnel.

c) It must be carried out by competent and experienced personnel, the most experienced person should be in complete control of the triage process, each team member should have a specific task and triage should conform to a system of categorization familiar to all the healthcare facilities.

17. Have you ever practiced drills in emergency response?

Yes ☐ No ☐

18. If yes when was it conducted?

19. Have you ever dealt with mass casualty incidences in the last one year?

Yes ☐ No ☐

20. If yes what will you say are the major challenges you are faced with as an Institution in dealing

with Mass Casualties?

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21. Kindly give suggestion on what should be done to improve responses to mass casualties

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22. In your normal practice of responding to emergencies, do you sort out and categorize the victims?

Yes ☐ No ☐

23. If yes what order do you use? (Choose one)

a)

i. Pool 1 (Green Tag) - Lightly injured, able to manage for themselves.
ii. Pool 2 (Yellow Tag) –Lightly injured, requiring assessment and treatment which can be provided on spot or emergency room.
iii. Pool 3 (Red Tag) - Requiring assessment and surgical intervention.
iv. Pool 3 (Black Tag) - wounded who will not survive the injury.

b)

i. Pool 1 – Dead/ wounded who will not survive the injury.
ii. Pool 2 -Requiring assessment and surgical intervention.
iii. Pool 3-Requiring assessment and treatment which can be provided on spot or emergency room.
iv. Pool 4- Lightly injured able to manage for themselves.

c) None of the above.

24. Who makes the decisions in sorting out the victims of an emergency in your Institution? (Choose one)

a) The decisions are made on the field by any qualified personnel present.

b) The decisions are made by the team leader.
c) All procedures and responsibilities are defined in advance in a contingency plan for receiving large numbers of casualties.

25. How are the injured, identified and sorted out at the emergency scene?(Choose one)
a) They are identified by the team leader who is the most qualified of them all.
b) They are interviewed then the information that they provide is used to determine the extent of the injury.
c) They are labelled with standardized cards which are prepared in advance and familiar to all personnel including the surgical unit.

26. The establishment of a reliable channel of communication between the spot where the accident has occurred to the hospital achieves the following goals; (choose one)
a) i. Announce the arrival of casualties, their number and the types of injuries.
ii. Find out how many casualties the hospital is unable to care for and establish where there are several surgical units that can be used.
b) For easy access of the hospital facilities.
c) In order to save lives, save time and for ease in treatment.

27. Which are the most important rules to follow when responding to emergencies? (choose one)
a) Identify the injured, sort them and treat them according to the extent of damage.
b) There should be equipment that is in working condition and qualified personnel.
c) It must be carried out by competent and experienced personnel, the most experienced person should be in complete control of the triage process, each team member should have a specific task and triage should conform to a system of categorization familiar to all the healthcare facilities.

28. Have you ever practiced drills in emergency response?
Yes ☐ No ☐

29. If yes when was it conducted?

30. Have you ever dealt with mass casualty incidences in the last one year?
Yes ☐ No ☐

31. If yes what will you say are the major challenges are you are faced with as an Institution in dealing with Mass Casualties?

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32. Kindly give suggestion on what should be done to improve responses to mass casualties

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Appendix iv: Observation Check List

1. Does the institution have a Contingency plans?

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2. Number of Ambulance units

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3. Number of Fire engines

……...

4. Any emergency response systems

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Appendix V: Budget

proposal development	10,500.00
Stationery	5,000.00
Typing and printing proposal	5,500.00
photocopy proposal questions	3,500.00
Transport	10,000.00
Project development	15,000.00
Miscellaneous expenses	20,000.00
Total Cost	**69,500.00**

Appendix vi: Research Permit

UNIVERSITY OF NAIROBI
DEPARTMENT OF SOCIOLOGY & SOCIAL WORK

P.O. Box 30197
Nairobi
Kenya

Fax 254-2-245566
Telex 22095 Varsity Nairobi Kenya
Tel. 318262/5 Ext. 28167

May 25, 2015

TO WHOM IT MAY CONCERN

RE: OBARA LENA MORAA – C50/79640/2012

Through this letter, I wish to confirm that the above named is a bonafide postgraduate student at the Department of Sociology & Social Work, University of Nairobi. Further, I wish to inform you that the student is collecting data for her research proposal on **"Institutional Capacity to Conduct Disaster Triage in Mass casualty incidents: A Case Study of Kisii County".**

Through this letter, I am kindly requesting you to provide the student with any form of support that is required to collect data.

CHAIRMAN
DEPARTMENT OF SOCIOLOGY
UNIVERSITY OF NAIROBI

25 May 2015

Dr. Robinson Ocharo
Chair, Dept. of Sociology & Social Work

c.c. **Dr. Ocharo - Supervisor**