KNOWLEDGE, ATTITUDES AND PRACTICE OF TRADITIONAL BONE SETTING IN IFTIN DIVISION, GARISSA.

BY

DR. JULIUS ROGENA AGWATA (M.B.ChB, Cert. In Tropical Medicine, UON); H57/70615/07

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Registration Number----------H57/70615/07

College----------HEALTH SCIENCES

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Professor of Public Health, School of Public Health, University of Nairobi

Signature---------- **Date----------**

Dr Rose Opiyo, PhD., M.Sc (Nutrition), (UON), B.ED (Kenyatta University).

Lecturer, School of Public Health, University of Nairobi

Signature---------- **Date----------**

Director, School of Public Health, UON

Dr. Dismus Ongore, PhD, M.B.ChB

Signature---------- **Date----------**

DEDICATION

This dissertation is dedicated to my wife Emily for supporting and encouraging me to continue despite the challenges.

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ABBREVIATIONS/ACRONYMS

ABBREVIATION	IN FULL
AIDS	Acquired Immunodeficiency Syndrome
AMREF	African Medical Research Foundation
CBD	Convention on Biological Diversity
CBOs	Community Based Organisation
CHW	Community Health Worker
CORPS	Community Owned Resource Persons
DMOH	District Medical Officer of Health
GOK	Government of Kenya
HIV	Human Immunodeficiency Virus
KAP	Knowledge, Attitude, Practice
KEMRI	Kenya Medical Research Foundation
KNH	Kenyatta National Hospital
MCA	Member of County Assembly
MOH	Ministry of Health
MRTH	Moi Referral and Teaching Hospital

NGO	Non-Governmental Organisation
NHDP	National Health Delivery Programs
TBS	Traditional Bone Setting/Setters
TRIPS	Trade Related Aspects of Intellectual Property Rights
UNICEF	United Nations Children Fund

DEFINITION OF OPERATIONAL TERMS

Attitude: This is a way of perception/opinion about traditional bone setting or a way of behaving towards the practice of traditional bone setting.

Beliefs: What one accepts as real and true? Usually what is held at cultural or peer level.

Bone fracture: This is when there is loss of continuity in the substance of the bone.

Community Health Worker: A trained person, often a volunteer, who works within the community to teach people about health practices, provides some simple treatments, and refers sick people to health facilities for better treatment.

Herbs: These are traditional concoctions that may be of animal or plant origin. They may be applied on the skin, taken orally, applied on skin incisions or splayed on the patient.

Knowledge: These are facts, information, understanding and skills that a person acquired through experience or education on traditional bone setting.

Orthodox methods: These are the conventional "western" methods of managing fractures. These are the methods used by the conventional orthopaedic surgeon

Pharmaceutical Agent: Drugs manufactured using Orthodox methods and administered to patients with intent to cure their ailments.

Practices: A way of doing something that is common, habitual and expected by individuals, the family and/or community in practicing traditional bone setting.

Surgery: These are services involving sutures, incisions, excisions, manipulation, and other invasive procedures that require local, regional, or general anaesthesia.

Traditional Bone Setting: That act of managing a fracture using traditional methods such as massaging, manipulation, splint age, applying herbs and other traditional concoctions.

Traditional Splint age: This is the use of bamboo sticks, held together by camel skin and arranged either longitudinally or in a circular manner to stabilise a fracture.

Referral: This is the act of sending sick persons from the home or community to a health facility (hospital, health centre and dispensary) or other care service or from the health facility to the community.

ABSTRACT

The main aim of the study was to determine the knowledge, attitude and practice of traditional bone setting among the people of Iftin in Garissa County. The study was a cross sectional descriptive study carried out at Iftin Division of Garissa County between October 2013 and May 2014. Socio-demographic characteristics of age, religion, socio-economic status, marital status and level of education of the participants were assessed. A semi-structured questionnaire was used to collect quantitative data from FGDs, KIs, case narratives, and community participants. The TBS practitioners were interviewed using a set score matrix criteria and tested by the Cronbach alpha estimation reliability test and a value of 5.14 obtained. Both qualitative and quantitative data analytical methods were used in the study. A total of 151 participants were selected through non-probability selection criteria and interviewed by the principal investigator and three plaster technicians as research assistants.

The community knowledge on traditional bone setting was at 95%, and the utilisation of the services of TBS by the community was at 90%.The preference for the service was determined by the level of education, Muslim religion and influence by family and friends. Being a Muslim was 22 times more likely to prefer TBS. Other reasons for patronage of TBS was cost, easy accessibility, cultural beliefs, and pressure from relatives and friends. While other factors such as gender, marital status and age did not influence the preference for TBS.

The four traditional bone setters scored highly on their basic knowledge to treat fractures. Out of a maximum score of 35, two TBSs scored above 30 and the other two scored 23 each. However, all the TBSs scored poorly on classification of dislocations. Complications associated with TBS in this study included joint stiffness, shortening of the limb, angulations, osteomylitis and gangrene leading to amputations.

The Iftin community have significant knolwlegde on TBS and have positively and strongly embraced TBS and consider it as a cultural norm. They believe that the orthodox form of fracture management is time consuming, and tied it to prolonged and expensive hospital protocols and procedures. While the community perceived low cost as a major influence on the choice of TBS, some charges by TBS were relatively high compared to the orthodox treatment costs. Although TBS practice had no formal documentation and training, their skills and knowledge on bone setting was reasonable and quantifiable.

It is therefore recommended that TBS cannot be ignored at Iftin and an impartial third party organisation be charged by the Garissa County healthcare system to bring the orthodox orthopaedic proponents and the traditional bone setter proponents together to set up and maintain acceptable working systems for TBS.

1.0: INTRODUCTION.

A fracture is present when there is loss of continuity in the substance of a bone. The term covers all bony disruptions, ranging from one end of the scale when a bone is broken into many fragments (multifragmentary or comminute fracture) to hair-line and even microscopic fractures at the other. (Graham A. Solomon, 2012). All fractures are either closed or open. In an open fracture there is a wound in continuity with the fracture, and the potential exists for organisms to enter the fracture site from outside. All open fractures therefore carry the risk of becoming infected. In addition, blood loss from external haemorrhage may be significant. In a closed fracture the skin is either intact, or if there are any wounds these are superficial or unrelated to the fracture. So long as the skin is intact, there is no risk of infection from outside. Any haemorrhage is internal. (Graham A. Solomon, 2012).

African traditional medicine has an important place in health care delivery among Africans. It is a first port of call before orthodox medicine and a last resort when all orthodox efforts fail ,and this is true especially for chronic illnesses.(Helman CG, 2000). Traditional medicine is holistic in approach. The patient is not only seen as a physical being, but also as a body with soul and spirit (Dada AA, 2011). The traditional healer seeks to strike some sort of equilibrium amongst these three components of the human being. This equilibrium can be brought about by herbs because herbs are natural and the patient's body which is only momentarily in disequilibrium is natural. Following this view, only nature can restore nature. Some of these means of treatment include herbalism, therapeutic dieting, hydrotherapy, bone setting, Uzo-massage and psychotherapy. Bone setting is a specialist aspect of African traditional medicine and involves fixing of fractured bones and dislocated joints in a traditional manner.(Kimani VN, 1995) and (Kafaru E, 1990).

Many bone setters are specialists whose only medical interest revolves around orthopaedics. The successes achieved in the area of orthopaedics by traditional healers have been so amazing that even the western orthodox medical practitioners have had to acknowledge the fact that traditional bone setters have a role to play in the management of these patients (Onuminya JE, Onbowale BO, Obkpa P, 1999). It has been noticed by the investigator that a substantial number of patients with bone injuries at Garissa Provincial Hospital are treated by traditional methods. Even the elite often times show evidence of doubt in the efficacy of orthodox methods of bone treatment. Traditional bone setting is a known procedure among Africans. Many interesting facts have been described in ancient ayurvedic classics on the management and treatment of fractures including the different kinds of bandages and slings to be used (Bali Y, 2012). The traditional way to make a diagnosis is clinical where fractures are said to be present when there is swelling, twitching, rotational deformity, tenderness, crepitus, and various forms of pain, continuous restlessness and loss of function of the affected part. Without the benefit of anatomical dissections, charts of the skeletal and organ structures or x-ray photographs, beliefs about how the body is constructed are usually based on inherited folklore, books and magazines and personal experience and theorising (Helman CG, 2000) and (Kimani VN, 1995).

Fractures are caused by the application of stresses which exceed the limits of strength of bone. Violence and motor vehicle accidents are the commonest causes. A pathological fracture is one which occurs in an abnormal or diseased bone. If the osseous abnormality reduces the strength of the bone then the force required to produce fracture is reduced, and may even become trivial. The less brittle bone of the child tends to buckle on the side opposite the causal force. Other fractures

that occur can be described as simple transverse, oblique, spiral communited impacted compressed avulsed, depressed or involving articular joint surfaces. (Graham A. Solomon, 2012).

In conventional medicine diagnosis of fractures is done through history, clinical examination, and radiological assessment. The primary aims of fracture treatment are: the attainment of sound bony union without deformity and the restoration of function, so that the patient is able to resume his former occupation and pursue any athletic or social activity he wishes as quickly as possible and without any risk of any complications, whether early or late. The initial treatment of the fracture requires that undue movement at the fracture site should be prevented by the use of temporary splint age till radiographic and other examination is complete (Graham A. Solomon, 2012). The commonest method used in fracture reduction is by the application of traction, followed by manipulation of the fracture and the stabilisation and immobilisation. This can be either through internal fixation, continuous traction, arm slings, bandages and adhesive strapping and plaster of Paris.

A loose splint will not serve the purpose while a tight one may cause pain and suppuration of the underlying tissues. After the actual treatment is over, a properly united fracture is one with absence of gaps between the broken fragments, no shortening deformity, and return of painless, easy movements (Graham A. Solomon, 2012).

2.0: BACKGROUND

2.1: Overview

Fractures are caused by the application of stresses which exceed the limits of strength of a bone. Violence and road traffic accidents are the commonest causes. Stresses, repeated with excessive frequency to a bone, may result in fracture.(Odero W, 1998).A pathological fracture is one which occurs in an abnormal or diseased bone. If the osseous abnormality reduces the strength of the bone then the force required to produce fracture is reduced, and may even become trivial.

Hair-line fractures result from minimal trauma. These fractures may be difficult to detect on the radiographs, and where there are reasonable clinical grounds for suspecting a fracture, the rules are quite clear: additional oblique radiographic projections of the area may be helpful, do not accept poor quality films and films repeated after 7-10 days may show the fracture quite clearly (due to decalcification at the fracture site) (Graham A. Solomon, 2012). Greenstick fractures occur in children, but not all children's fractures are of this type. The less brittle bone of the child tends to buckle on the side opposite the causal force. Other fractures that occur can be described as: simple transverse, simple oblique, simple spiral, comminute, impacted, compression, avulsion, depressed fractures, fractures involving the articular surfaces of a joint, fracture-dislocation, and fractures with axial rotation.

2.2: Diagnosis:

In some cases the diagnosis of fracture is unmistakable, e.g. when there is gross deformity of the central portion of a long bone or when the fracture is visible as in certain compound injuries. In majority of other cases, a fracture is suspected from the history and clinical examination, and

confirmed by radiography of the region. In every case of suspected fracture, radiographic examination of the fracture is mandatory.(Graham A. Solomon, 2012). Radiographs of the part will generally give a clear indication of the presence of a fracture and provide a sound basis for planning treatment. In the case where there is some clinical doubt, radiographs will reassure patient and surgeon and avert any later medico legal criticism.

2.3: Treatment:

Orthodox treatment methods are the conventional “western” methods of managing fractures. These are the methods used by the conventional orthopaedic surgeon. While traditional treatment is that act of managing a fracture using traditional methods such as manipulation, massaging, splint age, applying herbs and other traditional concoctions. (Dada AA, 2011).

2.3.1: Orthodox Treatment:

The primary aims of fracture treatment are: the attainment of sound bony union without deformity and the restoration of function, so that the patient is able to resume his former occupation and pursue any athletic or social activity he wishes as quickly as possible and without risk of any complications, whether early or late. These aims cannot always be achieved, and in some situations are mutually exclusive. For example, internal fixation of some fractures may give rapid restoration of function, but at the expense of occasional infection.(Graham A. Solomon, 2012).

The great variations that exist in fracture treatment are largely due to differences in interpretation of these factors and their relevance in the case under consideration.

The initial treatment of the fracture requires that undue movement at the fracture site should be prevented by the use of temporary splint age till radiographic and any other examination is complete [Oginni, 1992]. This will reduce pain and haemorrhage and minimise the chances of a closed fracture becoming open. If the deformity is so great that the skin overlying a fracture or dislocation is seriously endangering the viability of the overlying skin, it is usually advisable to do something to correct this; in many cases gentle repositioning of the distal part of the limb is sufficient; the use of Entonox (a strong pain killer) may be required.

If the fracture is an open one, a bacteriological swab should be taken and the wound covered with sterile dressings. Antibiotic therapy should be commenced immediately; the choice of therapy is dependent on the current status of bacterial flora in wound infections occurring in a particular local situation.

The fracture should be fully assessed by clinical and radiological examination: the site, pattern, displacement and angulations are noted. Involvement of the skin, and damage to related structures such as important nerves or blood vessels should be assessed. If a fracture is only slightly displaced, reduction may nevertheless be highly desirable, as for example in fractures involving the ankle joint, where even slight persisting deformity may lead to the development of osteo-arthritis. In other situations, some displacement may often be accepted, depending on the site involved, where good remodelling may be anticipated(especially in children), if the patient is very old, when the risks of anaesthesia may be considered to outweigh a problematical improvement.(Graham A. Solomon, 2012).

The commonest method used in fracture reduction is by the application of traction, followed by manipulation of the fracture, under general anaesthesia. General anaesthesia has most to offer in terms of muscle relaxation, duration and overall versatility, but for minor procedures regional anaesthesia and intravenous diazepam are popular and useful measures, with the advantage that waiting time may be reduced. Continuous traction is used to achieve a reduction in fractures of the femur and fracture dislocations of the cervical spine. (Graham A. Solomon, 2012).

Open reduction is carried out in open fractures, where conservative methods have failed to give a satisfactory reduction and where it is considered that the best method of supporting the fracture involves internal fixation, and exposure of the fracture is a necessary part of that procedure. Arm slings, bandages and adhesive strapping may be used to support a fracture until union occurs. Continuous traction may be maintained for several weeks, while holding a fracture in reduction. Fractures of the femoral shaft are frequently treated by this method. Traction may be effected through the skin (skin traction) or through bone (skeletal traction). (Graham A. Solomon, 2012).

Plaster of Paris, generally in the form of plaster-impregnated bandages, is carefully moulded to fit the contours of the limb, and the quick-setting properties of the plaster allow the limb to be held without undue strain in the correct position until setting has occurred. (Graham A. Solomon, 2012).

Internal fixation is indicated where a fracture cannot be reduced by closed methods, where a reduction can be achieved but it cannot be satisfactorily held by closed methods, where a higher quality of reduction and fixation is required than can be obtained by closed methods, and in the case of multiple injuries involving the lower extremities, the risks of respiratory distress syndrome,

fat embolism and other serious post-injury complications are considerably reduced by early operative stabilization of lower extremity(especially femoral) fractures. (Garba ES, 1988).

2.3.2: Traditional Treatments:

Traditional bone setting (TBS) is a known procedure among Africans and it involves use of splints and bamboo stick or rattan cane or palm leaf axis with cotton thread or old cloth (Dada AA, 2011). Many interesting facts have been described in ancient Ayurvedic classics on the management and treatment of fractures including the different kinds of bandages and slings to be used. The science of bone setting is included in Ayurveda, where it is termed Bhagna (Bali Y, 2012). Ayurveda is also a traditional form of medicine that originated in India more than 3000 years ago and it is currently practised worldwide and remains one of India's traditional health care systems (Bali Y, 2012).

There are five types of bones: flat bones, small cubical bones, cartilages, curved bones like rib bones and long or tubular bones. The effect of trauma on these kinds of bones also differs. For example the cubical bones are fragmented while the curved bones break or crack under the same fall or trauma. Bone injuries have been classified into two major types; open or compound, or closed or simple fracture. The latter is further classified as dislocations or fractures.

Dislocations are divided into six types and fractures into 12 types. The six types of dislocations include the following: fracture dislocation, dislocation of joints due to ligament tears, anterior-posterior dislocation of the head of the humerus, downward displacement of the head of the humerus, marked displacement of any articulation surface usually found in the knee joint and oblique dislocation in one of the articulating bones (Bali Y, 2012). Twelve types of fractures have

been mentioned and fully described by Susrutha. They are depressed fracture, oblique fracture, comminute fracture, fracture due to compression, spiral fracture, impacted fracture, complete compound fracture, green stick fracture, incomplete fracture, comminute fracture on the flat bone where it may be difficult to bring about permanent repair , fissured fracture and fractures caused by sudden passive flexion for example in interphallangeal joints if hit by a ball. This shows how much knowledge existed and how well organised it was so many centuries ago. (Bali Y, 2012)

The traditional way to make a diagnosis is clinical where fractures are said to be present when there is swelling, twitching, rotational deformity, tenderness, crepitus, and various types of pain, continuous restlessness and loss of function of the affected part. All these features were mentioned by Susrutha 3000 years ago. (Bali Y, 2012).

Without the benefit of anatomical dissections, charts of the skeletal and organ structures or X-ray photographs, beliefs about how the body is constructed are usually based on inherited folklore, books and magazines, personal experience and theorizing.(Helman CG, 2000).

Susrutha has also given consideration to the age factor in deciding the prognosis (Bali Y, 2012). According to him, skeletal injuries take one month to heal in young patients, two months in middle-aged patients, and three months in old patients. Dealing with the principles of treatment, Susrutha gives four basic steps that is traction, manipulation by local pressure, opposition and stabilisation and immobilisation. He also stresses that the splinting should not be too loose or too tight.

A loose splint will not serve the purpose while a tight one may cause pain and suppuration of the underlying tissues. After the actual treatment is over, Susrutha defines a properly united fracture as one with absence of gaps between the broken fragments, no shortening deformity, and return of painless, easy movements. Plants used in traditional bone setting are Amplocissuslatifolia, Anetemisla lacniata and Banbase Ceiba (Helman CG, 2000).

The continued use of TBS by Africans is based on the belief that it is cheaper, more available and results in faster healing than orthodox measures Dada AA, 2011). Forms of pain relief used by the TBS include herbs and mixture of herbs and pharmaceutical agents. TBS use pulling and /or massage, herbal bandage and wooden splints during the process. Majority of these practitioners have no knowledge of the existence or importance of orthodox fracture treatment and the role of X-rays in fracture diagnosis.

Traditional bone setting is a known procedure among the people of Garissa (Investigator's observation). There are practitioners practicing from their homes while there are others who practice from well established traditional bone setting centres. The established centres have in-patient facilities in form of wards. They lack X-ray facilities. Most of the bone setters use repeated manipulation and massage of fractured bones. There has been an attempt by the setters to introduce some forms of pain relief into their practice. The main pain relievers include herbs and a few of the practitioners are said to be combining herbs and pharmaceutical agents. This may be as a result of alliance with quack medicine dealers and some hospital staff (Iwegbn CG, 2004).

2.4: Causes of fractures:

It has been documented that fractures do occur mainly due to road traffic accidents, assault and injuries from terrorists, gunshot wounds due to interpersonal violence, falling from trees and occupational hazards especially injuries from wild animals (Jamison DT, 2006). Road traffic accidents are a major health problem worldwide. It is estimated that about 1.2 million people die each year as a result of road traffic cruses. Between 20 and 50 million people suffer from non-fatal injuries with many incurring disability as a result of their injuries. Ninety percent of the world's fatalities occur in low and middle income countries (WHO, 2015). While for a long time road traffic accidents have been the leading cause of permanent disability and mortality among those aged 10 to 44 years in developed countries, the same picture is unfolding in developing countries as they undergo what has been termed the "epidemiology of transition". (WHO, 2015).From a young age, males are more likely to be involved in road traffic accidents than females accounting for 73% of all traffic deaths (WHO, 2015). Road traffic injuries increase when the volume of travel and the use of motorised vehicles, especially two-wheeled vehicles, increase. They also occur more frequently with increasing speed and in places where roads cannot handle the increasing volume and speed of traffic. Injuries also result when pedestrians must share roadways with motorised and non-motorised vehicles.

Road traffic injuries in addition tend to increase as countries industrialize and grow economically. Later, as wealth increases and public institutions strengthen, countries invest in safety measures, but waiting for incomes to rise before implementing preventive measures results in the needless loss of millions of lives. In many developing countries, not only is the incidence of various injuries increasing but also the causative factors are changing from the historical patterns such as falling

from trees to injuries due to occupational hazards, interpersonal violence and road traffic accidents, which appear to be the leading cause of traumatic injuries. Statistics from many developing countries ascertain to these changes. (Jamison DT, 2006).

However, in Garissa, the pattern of causation of fractures seems to tilt to the historical one where falling from trees, interpersonal violence and occupational hazards is the main causes of the fractures. Though, lately, the incidence of road traffic accidents seems to be on the rise due to the upsurge in the number of vehicles and motorbikes. A comprehensive literature review published in 1997 showed that pedestrians accounted for between 41% and 75% of all road traffic deaths in developing countries (Odero W, Garner P, 1997).

In Africa, pedestrians and passengers of public transportation are the most affected. They represented 80% of all road traffic deaths in Kenya in 1990 (Odero W, Khayesi M, 2003). The severity of road traffic crashes is also likely to be much greater in Africa than anywhere else, because many vulnerable road users are involved, but also because of the poor transport conditions such as lack of seat belts, overcrowding, and hazardous vehicle environments. Death/injury ratios are, however, not easy to compare because of the differential reporting bias for fatal and non-fatal injuries.(Odero W, 1998).The paucity of surveillance data from African countries leads to uncertainties, and probably to under-estimates of the size of the problem (Khayesi M, 2005). The real magnitude of fractures in Kenya is not known but there is marked increase in road traffic accidents over the years.(Odero W, Garner P, 1997).

Implementing an effective and sustainable information system related to road traffic injuries should be a priority, as this will enable monitor trends in road traffic injuries to assess the effectiveness of new prevention policies; second, such a tool will also allow for a useful account of the characteristics of traffic insecurity, helping the prioritization of effective interventions (identification of hot spots, vulnerable road users, regional variations, and so on). Third, issuing persuasive figures through regular national or regional reports will help advocate for the allocation of appropriate resources. Data can come from death statistics, hospital registries and even from population surveys. Collection of police reports is, however, the most frequent system implemented in several African countries (Odero W, Garner P, 1997).

2.5: Health facilities infrastructure:

This may influence the utilisation of the traditional bone setters' services in that availability and proximity of health facilities to the populace can determine the choice of service delivery point. The major players in the health sector include Ministry of Health and Ministry of Local Authorities. Other players are non-governmental organizations (NGOs), faith-based organizations and the private sector. The private sector includes the traditional practitioners (The Ministry of Health, 2010).

Health services are delivered through a network of approximately 6761 health facilities with the public health system accounting for 51% of the total. This total comprises of 453 hospitals, 721 health centres, 3356 dispensaries, 154 nursing and maternity homes, and 1938 health clinics or medical centres. (The Ministry of Health, 2010).

The health system is designed much like the hub and spokes of a wheel (The Ministry of Health, 2006). In the centre are the main referral hospitals of Kenya, Kenyatta National Hospital (KNH) and

Moi Referral and Teaching Hospital (MTRH). In addition, there are eight provinces in Kenya, and each has a referral hospital that in turn refers to the national hospitals. Lately, a number of hospitals have been elevated to the provincial hospital status (level 5). These hospitals directly refer to the two national hospitals.

There are also a series of sub-district or district hospitals within each province that refer to the provincial hospital or the level 5 hospital. Each district also has a succession of health centres.
The most peripheral health care facilities are the dispensaries. These are located within 4-5 kilometres of each village or community, and are considered to be within walking distance. Throughout in health care system, there are also a number of private health facilities, religious organisations, non-governmental organizations and traditional healers.

The health centres are the first line of referral from the dispensary. These health centres are staffed by a registered nurse/midwife, who is responsible for maternity care. There is also a clinical officer who has a diploma in clinical medicine and diagnoses and treats patients. Each health centre also has a records officer, and some health centres have laboratory and pharmacy technicians, although this is not universal. Other staff that might be available at the health centres include: medical social workers, children officers, public health officers, orthopaedic technicians, and nutritionists.

The health centre has about five beds for maternity care. These beds can also be used in an emergency if a patient is to be transferred to a district or provincial hospital/Level 5 hospitals. Most health centres have a vehicle for transportation. Some of these health centres have been

converted into sub-district hospitals by posting a doctor to be in-charge of the health facility. However, the infrastructure remains the same as before. The dispensary is at the periphery of the health care system, and functions as a primary care facility, providing both curative and preventive health care. These dispensaries are supposed to carry basic drugs and supplies, although these supplies are sometimes unavailable. There are no orthopaedic technicians at the dispensary level. (The Ministry of Health, 2010).

At the community level, there exist some organised structures of Community Health Workers (CHWs). These are volunteers and they are Community Owned Resource Persons (CORPS). This is the level one of health care. The CHWs link the community to the dispensaries and they are directly supervised by the Community Health Extension Workers (CHEWS). The CHEWS are either nurses or public health officers or technicians who work at the dispensary or the health centre.(Kaseje MA, 1987).

Each CHW takes care of 20 households and 50 CHWs form a Community Unity. Each Community Unity is attached to a health facility. At the health facility, the Community Unity has a blackboard and chalk that outlines the challenges within the catchment area and the health indicators for that area in the designated month. The health workers in the health facilities (CHEWS), link with the community through the CHW. (Kaseje MA, 1987).

Garissa County has one level five hospital and a sub-county hospital at Iftin. The two are approximately five kilometres apart. The level five hospital caters for five Counties namely,

Mandera, Wajir, Garissa, Tana River and part of Kitui. There are three orthopaedic and plaster technicians, but there is no orthopaedic surgeon (Garissa hospital records, 2009).

Orthopaedic services in Kenya are still poorly resourced. The teaching institutions are poorly staffed with junior surgeons, and unfortunately there are no management protocols. The distribution of orthopaedic services is still uneven leaving poor services to the far flung areas (Mulimba JAO, 2007).

3.0: LITERATURE REVIEW.

3.1: overview on knowledge of traditional bone setting

Traditional bone setting is a known procedure among Africans. A traditional bonesetter is a lay practitioner of bone and joint manipulation. He or she is the unqualified practitioner who takes up the practice of healing having had no formal training in accepted medical procedures.('Garissa Hospital Records', 2009) Many interesting facts have been described in ancient ayuvedic classics on the management and treatment of fractures including the different kinds of bandages and slings to be used. The science of bone setting is included in ayuveda, where it is termed Bhagna (Bali Y, 2012).

Modern day health care has greatly evolved following advances in technology and medical research. But despite the availability of these services, traditional bone setting has continued as an alternative health service. In developing countries- especially in the Indian Subcontinent, Africa and South America with less developed health care resources-these unorthodox practitioners still play an important role in providing primary "medical" support.(Green SA, 1999).

Although not widely acknowledged, bone setting has roots in most countries though the name, art and practice may vary from place to place. However, accurate statistics about traditional bonesetters, distribution or numbers are unavailable in most countries. According to one estimate, between 10 to 40% of patients with fractures and dislocation, in the world are managed by unorthodox practitioners (Agarwal A, 2010).

In many developing countries, the traditional care of diseases and afflictions remain popular despite civilisation and the existence of modern health care services (Summer C, 1983). The traditional bone setters perhaps more than any other group of traditional care-givers enjoy high patronage and confidence by the society (Thanni LOA, Akindpe JA, 2000). Indeed, the patrons of this service cuts across every strata of society including the educated and the rich (Summer C, 1983).

African traditional medicine consists of knowledge received from the past and handed down from generation to generation as well as recent knowledge that may be the product of deliberate experimentation and observation (WHO, 2000). This knowledge is not documented, not researched and it is pasted on anecdotal. African traditional medicine has an important place in health care delivery among Africans. It is a first port of call before "western" or orthodox medicine and a last resort when all orthodox efforts fail. (Jamison DT, 2006).

It must be indicated that African traditional medicine is holistic in approach. The patient is not only seen as a physical being, but also as a body with soul and spirit. The traditional healer seeks to strike some sort of equilibrium amongst these three components of the human being. This equilibrium can be brought about by herbs because herbs are natural and the patient's body which is only momentarily in disequilibrium is natural (Kafaru E, 1990). Following this view, only nature can restore nature. Some of these means of treatment as Dime suggests are: Herbalism, therapeutic dieting, hydrotherapy, bone-setting, Uzo massage, psychotherapy etc. Bone-setting is a specialised aspect of African traditional medicine. (Kimani VN, 1995).

It may be true that some traditional healers dealt in all aspects of cure but specialised in only certain aspects of human treatment and they involved themselves in no other aspects. Many bone-setters are specialists whose only medical interest revolves around orthopaedics. The successes achieved in the area of orthopaedics by traditional healers have been so amazing that even the western orthodox medical practitioners have had to acknowledge the fact that traditional bone setters have a role to play in the management of these patients. (Oginni LM, 1982). The Ijaw people of Nigeria (who perhaps started bone-setting) have excelled in this area (Nkele CN, 2000). The practice is wide-spread in Nigeria including areas well served with healthcare facilities such as Lagos, Ibadan and Enugu (Onuminya JE, Obekpa PO, 2000). Unfortunately, however, the outcome of their intervention in trauma care frequently leads to loss of limbs, lifelong deformities and sometimes death. Several of the studies have identified the following as reasons for the patronage of traditional bone setting: cheaper fees, easy accessibility, quick service, cultural belief, utilisation of incantations and concoctions and pressure from friends and families .(Dada AA, 2011).

In Nigeria, about 85% of patients with fractures present first to traditional bone setters (Omolulu, 2008). One of the most important flaws of the practise of TBS in Nigeria is the process of training and acquiring skills in bone setting, which is not formal, undocumented and uncontrolled with attendant continuous decline in imparted knowledge and hording of information. Further the practise is passed on by oral tradition and there is no regulation, review and even peer-criticism. Quality is therefore not guaranteed and complications are high. This is unlike orthodox training, which is regulated, open and subject to regular review on the basis of new evidences(Dada AA, 2011).

In China, Chinese-style doctors are trained in care of diseases including pain control, fracture and sprains management. The practice is regulated and practitioners undergo structured training resulting to minimal complications (Garba ES, 1988). In Turkey, practitioners have been trained to refer difficult cases (Dada AA, 2011).

African traditional medicine providers, these days, move from the rural to the urban areas with the sole purpose to enrich themselves. They are patronized by unsuspecting “patients”. These mobile practitioners of African traditional medicine sometimes do not know anything about African traditional medicine, especially bone-setting. They are merely people who unable to cope with the present economic situation, resort to this “trade” (Udosen AM, Otei OO, 2006). They, perhaps, are in business because most Africans somehow have faith and confidence in traditional medicine.

Another problem associated with African traditional medicine (even in the past) is when it sometimes resorts to spiritual explanations for the causation of ill-health and complications which is attributed to mystical forces (Sofowara A, 1982). This is disturbing, while there may be some very small cases of illnesses with mystical explanations, most illnesses have scientific explanations/causation. This factor limits African traditional medicine to the extent that it is extremely difficult to provide explanations and evidence in accordance to basic epistemology for the cure of ailment even when the therapy is effective. For instance, in Nigeria, everyone perceives that orthopaedic cases are better managed by traditional healers, but the connection between the broken leg of a chicken and the eventual treatment of a patient with broken bone is extremely difficult to explain.

In western medicine, scientific explanations are provided on how a particular drug works with the body chemistry, in that wise, one cannot expect the west and indeed non-Africans to accept any kind of cure or advances in medicine by Africans without adequate explanations. (Oginni LM, 1982).

Health care can no longer be carried out under the cloak of secrecy. Some traditional knowledge have in the recent past become disclosed as a result of codification (that is, formalization in written form), wide use, or through collection and publication by anthropologists, historians, botanists or other researchers and observers (Koning M, 1998).However, in comparison to the situation in Asian countries such as India and China where a lot of indigenous medical knowledge has been disclosed through use and publication (Onuminya JE, Obekpa PO, 2000), disclosure of traditional medical knowledge remains relatively limited in Kenya.

In contrast to the Asian situation, traditional medicine in Kenya remain non-codified and include what have generally been termed “folk”, “tribal”, “rural” and “indigenous” which has been handed over orally from generation to generation in communities. They are generally based on traditional beliefs, norms and practices based on centuries old experiences of trials and errors, successes and failures at the household and community level (Adebule GT, 1991). Thus a significant part of traditional medicine in Kenya remains secrets.

In specialised areas, such as knowledge held by bone-setters, access is restricted to certain classes of people (Nkele CN, 2000). Often times, the efficacy of a procedure is not sufficient, the

side effects and other issues equally come to the fore. Otherwise, health resources which are usually limited would be merely spent without corresponding improvement in health care generally.

The methods and procedures of the trial of new drug or treatment before its application on humans in African traditional medicine are weak. That the bark of a particular tree is effective in animals is not enough and sufficient reason that the same bark would be effective in treating similar ailments in humans. (Koning M, 1998).

African ethics is based on the consideration for human welfare. The Akan people of Ghana can be used to illustrate this argument, that, if you asked an average Akan, if it was wrong to go to bed with another man's wife, his response is most likely to be, "would you like it if that was done to you?" while according to Oluwole (Oluwole SB, 1988), Yoruba ethics which is based on secular morality is to enhance justice. On the same line of thought, professor Summer (Summer C, 1983) argued that Ethiopian traditional morality is based on the natural light of reason. R.M Downess (Downess RM, 1977) summed up the idea of African ethics as doing good to others and not evil. From the aforementioned, one may safely conclude that African ethics is founded on justice and concern for others. Based on African ethics, it is wrong to use subjects for experimentation without their consent, especially well informed and knowledgeable consent.

Studies done at Calabar, Nigeria by Udosen have shown that traditional bone-setting is associated with severe complications, such as pain, gangrene, malunion, non-union; joint stiffness and infections, people still prefer this method of treating fractures.(Udosen AM, Otei OO, 2006). The continued use of traditional bone-setters by Africans is based on the belief that it is cheaper, more

available, cultural belief, there is utilisation of incantations and concoctions and results in faster healing than orthodox measures. (Dada AA, 2011). Friends and families of those with fractures pressurise for this service.

3.2. Knowledge, skills and practice

Traditional bone setting is a well recognized and age long practice in African tradition. The treatment of bone injuries is associated with much mythology and superstition. It is a known fact that the treatment is associated with severe complications, such as pain, gangrene, malunion, non-union, joint stiffness and chronic osteomylitis. The different methods used in the treatment include use of splints and bamboo stick (Udosen AM, Otei OO, 2006) or rattan cane or palm leaf axis (Onuminya JE, Obekpa PO, 2000) with cotton thread or old cloth. This is wrapped tightly on the injured part and left in place for the first 2-3 days before intermittent release and possible treatment with herbs and massage (Bali Y, 2012) and (Thanni LOA, Akindpe JA, 2000). This release of the splint is however not uniformly practiced.

Massage and manual traction of the affected bone is another method used in treatment. This may be done exclusively or in conjunction with the use of traditional splint and herbs application. Fractures that fail to heal with routine treatment of splinting and massaging may be given further traditional treatment by way of scarification, sacrifices and incantations (Dada AA, 2011).

The complication of treatment is usually a function of the method applied. Where splints have been applied, compartment syndrome, extremity gangrene and Volkmann ischemia are known and regularly occurring complications and where massaging and pulling are the preferred treatment

option, they usually lead to heterotrophic ossification and non-union and scarification have been known to lead to chronic osteomylitis, sepsis and tetanus (Dada AA, 2011)

Most patients will first visit the traditional bone setter before thinking of coming to the hospitals. The few who come to the conventional hospitals are those who have either developed complications following traditional bone setting or were involved in a major road traffic accident or accidents with wild animals e.g. crocodile bites, elephants and other animal fights.(Review of Garissa Provincial Hospital data).The reasons for this include high cost and delay in treatment in hospitals, fear of operation/amputation and fear of medical jargons and application of plaster of Paris (POP) in specialist centres. (Garba ES, 1988).The accident victims either from the wild animals or the road traffic accidents want to come to the provincial hospital because of compensation from either Kenya wild life service's or the insurance companies. This compensation can only be done if you were treated by an orthodox practitioner at the government hospital.

There is an erroneous belief in traditional Africa that the only available option for treatment of fractures in hospitals is amputation. (Thanni LOA, Akindpe JA, 2000). It is also believed that the application of plaster of Paris (POP) usually results in atrophy and gangrene of affected limbs. Patients/relations are warned not to seek orthodox care when they have fractures/dislocations. These behaviours have placed a great burden on the orthodox traumatologists who spend their expertise in correcting complications rather than practice modern orthopaedics. (Thanni LOA, Akindpe JA, 2000). these wrong beliefs can only be eradicated through education, public enlightenment and functional health insurance for all citizens.(Onuminya JE, Onbowale BO, Obkpa P, 1999)

There has always been an attempt by the bone setters to introduce some form of pain relief into their practice. (Udosen AM, Otei OO, 2006). It should be noted that the application of analgesics without proper reduction and immobilization of fractures is a futile exercise. (Udosen AM, Otei OO, 2006). Studies done have shown that most bone setters are semi-illiterate in formal education and it is predominantly a male trade. Majority of the practitioners' belief that the trade is hereditary, and do not see any need to collaborate with or make referrals to orthodox practitioners. (Udosen AM, Otei OO, 2006). Majority of traditional bone setters use the same method of herbal cream application, native bamboo splinting, frequent pulling and massage. Complications such as tetanus, gangrene and non-union are usually attributed to charms and witchcrafts. They lack basic knowledge of anatomy and physiology.

3.3. Attitude and community support

Patients often prefer the private sector health services for a number of reasons. These reasons include geographic accessibility, convenient opening hours, and more favourable staff attitudes, as well as perceived better quality in terms of shorter waiting times, greater privacy, higher standards of diagnosis, better (perceived) treatment, and counselling (Garba ES, 1988).

In Nigeria, about 85% of the patients with fractures present first to TBS. It is therefore of public health importance that the practice of this discipline be well understood. Virtually all reviewed literature on TBS agree that these service has existed for decades and tribes practice it and practitioners keep it as a family secret. The training is passed from one generation to another through skills and experience acquired as part of an ancestral heritage (Dada AA, 2011).Traditional healthcare exists everywhere in Kenyan communities. It is a product of social institutions and

cultural traditions that have evolved over many centuries to enhance health. Traditional medicine endeavours to meet health needs in the historical, geographical and cultural context in which it is placed. (Oginni LM, 1982).

It is estimated that about 80% of the Kenyan population use some form of traditional medicine. Traditional medicine remains a rich cultural heritage whose potential is not always fully known and utilised because of ideological, political and technological constraints. The practitioners of traditional medicine and healthcare are traditional healers- herbalists, snake and scorpion bite experts, traditional bone-setters, traditional birth attendants and spiritualists (fetish priests and exorcists, who paralyze the witchcraft of sorcerers.) (Odero W, Garner P, 1997). Majority of these patients believe that diseases and accidents have spiritual components that need to be tackled along with treatment with traditional means like the use of incantations and concoctions (Thanni LOA, Akindpe JA, 2000).

Though patronage of TBS is influenced by quite a number of factors, a major reason is the perceived cheaper fees. However, this has been better characterised to be multiple little payments are allowed by bonesetters and payment in kind with clothes and life animals (Dada AA, 2011). Furthermore, there is a strong social and family tie in Africa in general. Friends and family are therefore an important group in the choice of the type of treatment the injured or sick relative will receive. However, there are some valid reasons for patronage of TBS and these include easy accessibility and quick service rendered by the TBS compared to hospitals where there are protocols and queues before patients can be seen (Dada AA, 2011).

3.4. Social-economic impact on bone setting as a form of management of fractures

Traditional bone setting can be considered as Folklore. Folklore in its broadest sense is referred to as a set of literary, artistic, religious, scientific, technological and other traditions and productions which are transmitted from generation to another. It may also include literary works of any kind, oral, or written such as tales, legends, proverbs and myths. It includes music, dance, religious traditions and ceremonies.

Folklore has traditionally been approached from a copyright perspective. However, while copyright may be relevant to protect some aspects of Folklore such as literary, musical and artistic works, the technological and methodological content of Folklore such as inventions, craft, designs and carvings may not be protected. (Kimani VN, 1995). Traditional bone setters consider themselves as folklore and therefore they see orthopaedic practitioners as intruders into their business (Udosen AM, Otei OO, 2006). Furthermore the majority of those who patronise them are predominantly illiterate or semi-illiterate.

Studies done at Calabar, Nigeria also indicate that it may be difficult to stop traditional bone setting in our African society but may be easy to stop the complications associated with this procedure. Training of orthopaedic technicians to go to the level of the community and teach and refer patients with fractures and dislocations may suffice. Alternatively training of more specialists in the area of orthopaedics and traumatology and provision of adequate basic equipment/appliances in our health institutions may reduce the rate of “Leaving hospital to the traditional bone centres against medical advice”. (Udosen AM, Otei OO, 2006)

For now the activities of the TBS is a great hindrance to the practice of modern orthopaedics in Africa. Some people have suggested that TBS should be trained and integrated into the community health system, though this may not offer the desired solution. The National and International organisations through primary health and community health systems should take urgent steps to help prevent the complications arising from traditional bone setting. This can be achieved through eradication of poverty and ignorance as well as making appropriate registration to restrict this menace (Udosen AM, Otei OO, 2006). Initiation of community projects that would create awareness among TBS and patients would discourage these harmful practices. (Udosen AM, Otei OO, 2006).

4.0: STATEMENT OF RESEACH QUESTION.

4.1: Research problem

The number of patients with fractures in Garissa Provincial Hospital has increased from 10 patients per month on average to 50 patients per month between 2009 and 2011, and this is significant increase (Garissa Medical Records, 2011). This is due to increased road traffic accidents, refugee influx from Somali with gunshot wounds of lower extremities and increased assaults from hand grenades. Most of these patients are referred to Garissa hospital. Some of the patients may not access the hospital depending on circumstances that have caused the fracture. (Garissa Medical Records, 2011) The majority of those who access the hospital are those who anticipate insurance compensation. A number of assault cases may not access the hospital, either because of the poor infrastructure or because of fear on security authorities trying to establish the cause of the injury. (Rogena Julius, n.d.)

The Garissa hospital is also limited in handling difficult and complicated cases because of lack of a resident orthopaedic surgeon. The hospital relies on volunteer doctors from AMREF who come twice a year to treat these difficult cases. Patients who cannot wait are referred to Nairobi. Fracture treatment takes several weeks to months and this poses a challenge to the nomadic communities due to their complex lifestyle.

The Iftin community is a mixture of semi-nomadic population and permanent residents. There is an existing traditional fracture management service and the community belief in this service. It is believed by the Garissa community that majority of TBS reside at Iftin. The Iftin Sub-county hospital is the main orthodox hospital for this community. The hospital lacks x-ray machines and has no

fracture technician. Therefore patients with fractures and dislocations have to either seek help from traditional bone setters or travel to Garissa provincial general hospital for help. In this study, knowledge, attitude and practice of the Iftin community on TBS will be assessed. The bone setters' knowledge will also be assessed and the information will be crucial for fracture management in this part of the country. Since the bone setters are the nearest to the community, the level of patronage by community to TBS and the reasons why the community patronage bone setters will help mitigate on the way forward for these residents. The central government has encouraged utilisation of traditional medicine.

4.2. Conceptual Framework

There are a number of factors that influence the knowledge, attitude and practice of TBS and the diagram below provides key categories of these factors. Analysis of these factors will help in clarifying the delivery of the TBS services and the potential for enhancing the effectiveness of these services.

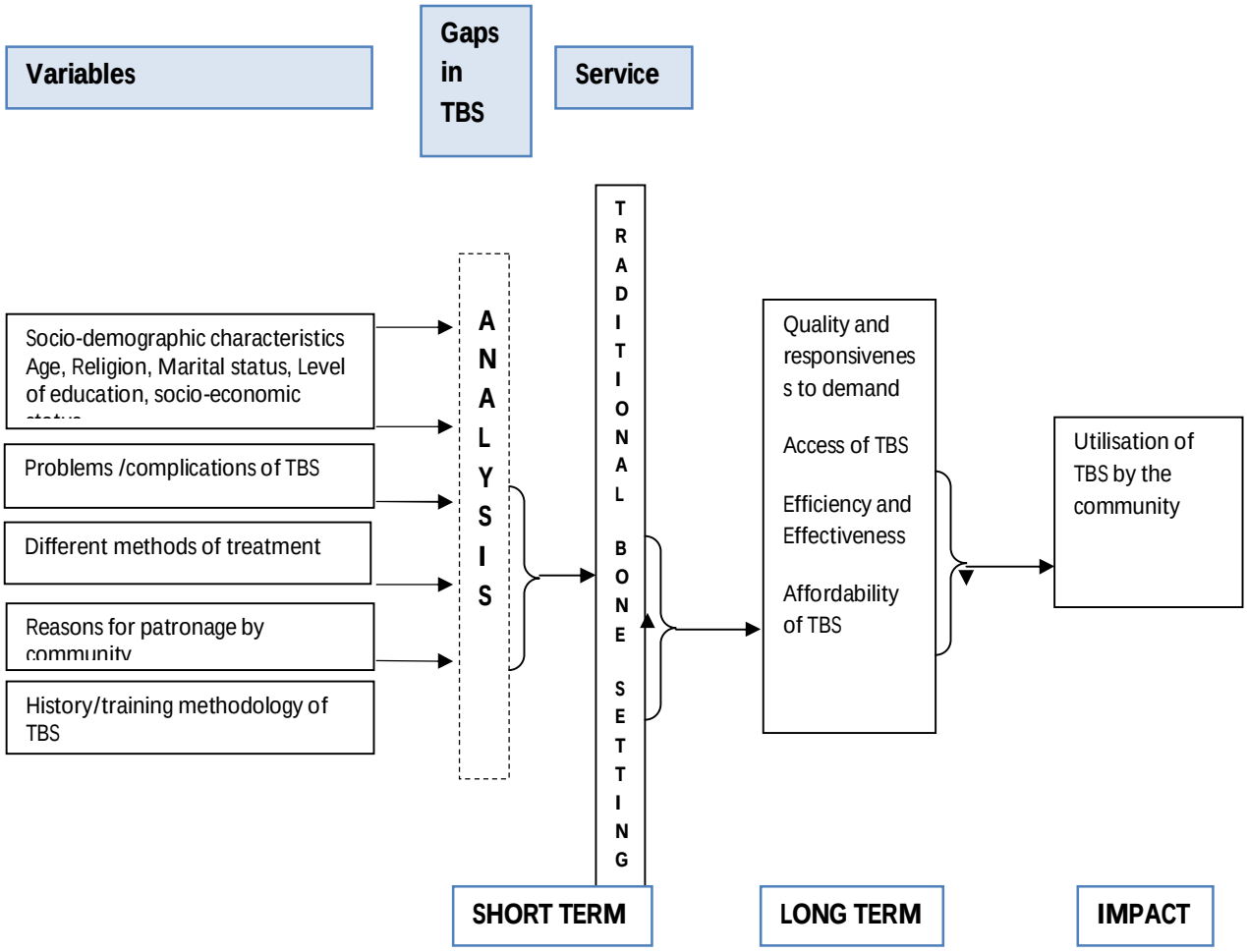


Figure 1: Conceptual Framework

4.3: Justification

In Garissa, the traditional bone setters perhaps more than any other group of traditional care-givers enjoy high patronage and confidence by the society. It has been noticed by the investigator that majority of the patients with bone injuries at Garissa Provincial General Hospital are treated by traditional methods. Even the elite often-times shows evidence of doubt in the efficacy of orthodox methods of bone treatment. Despite the strong points of African traditional medicine, there are

some obvious short comings especially as it is practiced today. The practice has no formal training, documentation, and no research has been carried to establish efficacy in comparison to orthodox medicine. There is limited information on the knowledge, attitude and practice regarding this form of management. These limitations have almost discredited the very important heritage.

The magnitude of injuries as a result of animal rustling, grenade attacks, road traffic accidents and falls among other forms of injuries is high in this County. The high workload at Garissa hospital and it's inaccessibility to the majority of patients with fractures compounds the problem.

The Kenya government is in the process of recognizing traditional health practices and systems, and wishes to incorporate it into National Health Delivery Programmes (NHDP), including insurance, natural medicines, traditional foods, Traditional Health Practitioners and other health workers at all levels of education.

With these facts in mind, the study was designed to describe the practice of traditional bone setting as a form of traditional medicine and whether this can be applied to breach the gap in orthopaedic services following trauma..

4.4: Objectives

4.4.1: Main Objective:

To establish knowledge, attitudes and practice of Traditional Bone Setting in Iftin Division, Garissa District.

4.4.2 Specific Objectives

1. To determine socio-demographic characteristics of the respondents.

2. To establish knowledge and skills in traditional bone setting in Iftin Division of Garissa District.

3. To determine health seeking behaviour of patients with fractures in Iftin Division

4.5: Research questions

1. To what extent is traditional bone setting utilised in Iftin Division of Garissa District

2. What factors influence utilisation of traditional bone setting

5.0: STUDY METHODOLOGY

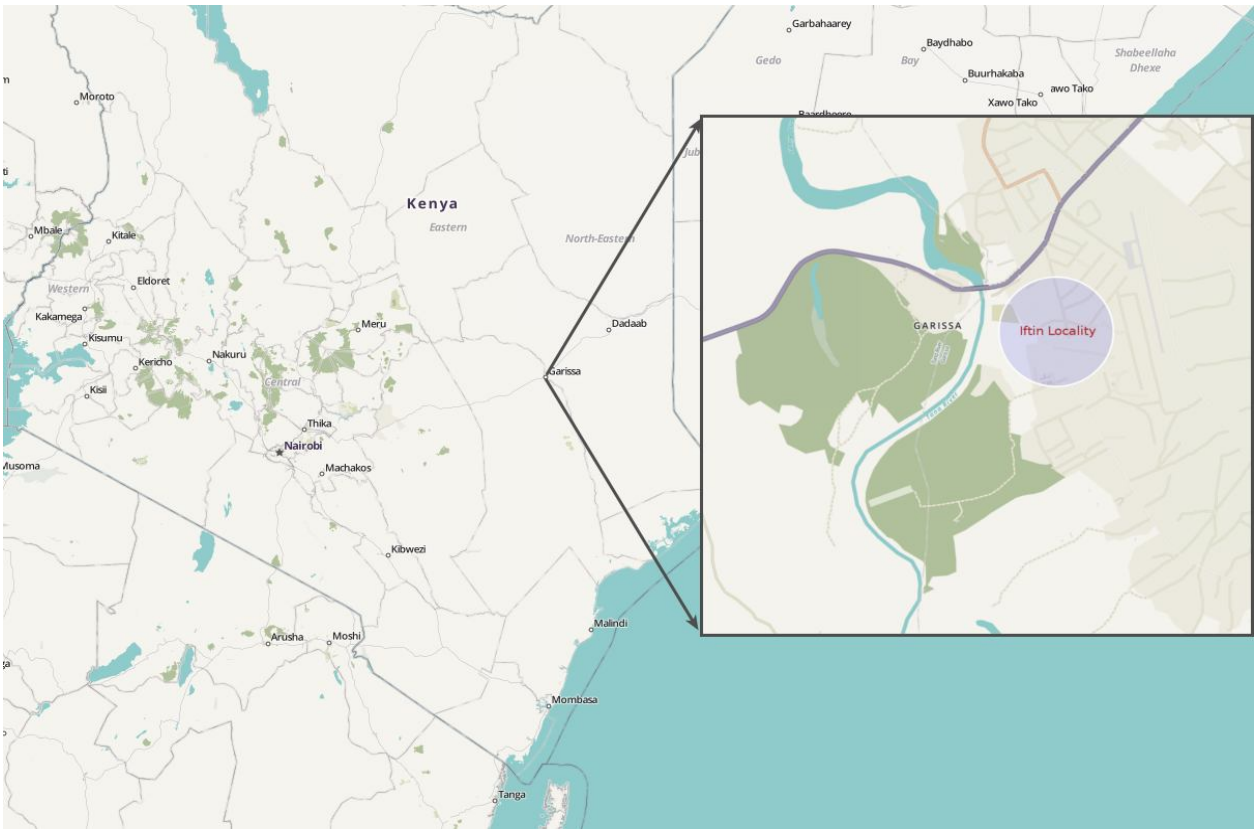
5.1 Study Design

This study was a descriptive cross sectional study done between October 2013 and May 2014

5.2 Study Population

1. Adult male and females aged 18-80 years of the Iftin community of Garissa County who had resided in the area for a minimum period of three months and had heard no fractures
2. Patients who had had fractures and treated by TBS
3. Selected known traditional bone setters
4. Community gate keepers

5.3 Study Area



Map 1: study area- Iftin division is shown located to the east of Garissa town separated by Iftin river (Google map)

Iftin is one of the divisions of Garissa District and is approximately five kilometres east of Garissa town. The inhabitants are a mixture of semi- nomads and permanent residents. It covers an area of 17.0 sq kilometres with a population of 24,600 persons (Population census, 2009) comprising 400 villages and 4469 households. The division is peri-urban and growing very fast with a population density of 1450 per square kilometre. It is becoming cosmopolitan since people from all-over Kenya are now settling here. “Iftin” means light. This is interpreted to mean brightness or “liberated”. Majority of the population had settled here as a result of losing all their livestock due to

prolonged drought and with the settlement of non-Somalis, the area has now become semi-urban. They are involved in petty trade like selling charcoal, collecting and selling firewood, retail shops, milk sale, water vending and selling food in small kiosks. A few persons do livestock trade on small scale.

The climate is hot and dry with a temperature ranging between 30-39 degrees centre-grade and receives an average of 250mm of rainfall per year, which is erratic and unreliable. The type of soil found in the area is sandy that has salt bearing rocks. Thorny trees and shrubs is the main vegetation. However, along river Tana, which has alluvial soil deposits, subsistence farming is practiced. Grass and acacia trees are found on the riverbanks. There is fairly reliable road network within the area as well as connecting it to other parts. There is a public road transport system, which is affordable and reliable. Telephone and electricity services are available and accessible to the community. This division has one sub-district hospital, which until recently was a health centre. It is poorly equipped and lacks water supply. The hospital serves people from the neighbouring location like Waberi and Bour-Algy.

The community members are conservative and have not been influenced by the urban way of life. The residents are in the low income bracket and mainly rely on food donated by the Government and other development partners. Despite their poor living conditions, they are able to offer cheap labour to earn an income. Malnutrition and anaemia are rampant in the area. The little income they get is mainly spent on school fees, transport, animal feeds, building materials, medical expenses, miraa and foodstuffs. Majority of the residents depend on water ferried by donkey carts and water boozers for their daily use. This is raw water from River Tana. The other source of water is from

two available bore –holes. The division has 6 primary schools with an enrolment of about 2,000 pupils. There are 2 secondary schools with 450 students. There are more boys than girls in primary schools. This is due to cultural barriers. The community has the belief that educated girls are immoral. They also perceive that boy's education is more important, because the boy will always be at home, but girls will marry off and benefit other homes. The rate of withdrawal and transfer of pupils from the division is high. This is probably due to lack of quality education and educational facilities. Majority of the schools do not have clean water supply. Sanitation facilities are either in very poor conditions or not available in many of the schools.

5.4. Inclusion criteria

To be eligible for the study, the following criteria were used:

- Legal age (18 years old) to give informed consent
- 10 clients known to have had fracture in the last six months, and were residents of Iftin for the last three months.
- 4 prominent providers of traditional bone setting in the community.

5.5 Exclusion criteria

The following were excluded from the study:

- Respondents below18 years of age and above 80 years of age
- Those visiting Iftin and had lived less than six months before the research

Those who declined to give consent to participate in the study.

5.6 Variables

5.6.1 Independent variables

Socio- demographic characteristics of Age, Religion, Socio-economic status, marital status and level of education were assessed.

5.6.2 Dependent variables

- Knowledge on traditional bone setting—duration of practice, where the practitioner got the training, whether can classify fractures, whether had trained anybody else and whether he was licensed by any government authority). The traditional bone setter was scored on the above parameters using the below matrix:

5.7 Study procedures

5.7.1 Preparation:

Sensitization meetings were held with the District Medical Officer of Health (DMOH), Garissa District, the Medical Superintendent, Garissa Provincial Hospital and three plaster technicians. In the meeting, the principal investigator explained the aims of the study to the DMOH and the Medical Superintendent and requested for their permission to conduct the study both in the hospital and at the Iftin community. Evidence of the approval of the study from the Kenyatta National Hospital/University of Nairobi Ethics & Research Committee was provided by the principal investigator. The 3 plaster technicians, who were recruited as research assistants were trained on the tools for collecting the qualitative and quantitative data (Annex 1). The research assistants were also trained on the use of voice recording gadgets.

5.7.2: Recruitment

The targeted population was 18 to 80 years age group in Iftin Location, Garissa district. A list of ten villages in the location was identified. In these villages, ten villagers were recruited randomly

according to the inclusion criteria. The purposive non-probability sampling method was employed. Purposively, all prominent known traditional bone setters within the division and known clients who may have benefitted from traditional bone setting in the last one year were included in the sampling. The purposive inclusion of all known traditional bone setters was to help the researcher if possible interview all TBS within the division of Iftin. Hence, members of the community, TBS, their trainees and those who may have benefitted from traditional bone setting were interviewed.

5.7.3 Sample size

The sample size was 151. This comprised of 95 community participants, ten participants per each of the randomly selected ten villages, and six focus group discussions, each group comprising of eight members giving a total of 48 participants. The rest were two key informants, and two case narratives and four traditional bone setters. DMOH and the Member of County Assembly provided key informant interviews. The two case narratives were survivors managed by TBS. All the four TBS in Iftin were recruited into the study.

5.7.4 Selection of participants for qualitative data

The respondents for key informant interviews were chosen from the policy makers of the community. This included the DMOH and the Member of County Assembly (MCA). Two members who had had fractures and treated by the traditional bone setter were identified and gave the case narratives.

The 48 participants who underwent focused group discussions represented the villages selected as much as possible and were not part of the ones who participated in quantitative interview or the

case narratives. These were purposefully selected with each village represented by five participants. The distributions of these forty eight were: 32 males and 16 females.

The respondents represented the villages selected as much as possible. To ensure representation, all the stakeholder groups were approached by the principle investigator to select participants for the focus group discussions.

5.7.5 Selection for participants for quantitative data

Using data from the Iftin Location Chiefs office, all the 30 villages in Iftin were identified and numbered one to thirty. This acted as the sampling frame. From this frame, every second village on the frame was selected until ten villages were identified. The households in the ten villages were identified and numbered one to a hundred. The heads of these 100 households from the selected ten villages were then picked as participants to represent the community.

5.8 Data collection

Both qualitative and quantitative methods of data collection were used in this study. Focus group discussions (FGDs), key informant interviews, case narratives and semi-structured questionnaires were administered. The interviewers comprised of three plaster technicians working at Garissa County. They were trained at Garissa provincial general hospital by the principal investigator. The training was carried out within the hospital and entailed familiarisation of the objectives and scope of the study. In addition they were taken through the study tools.

Questionnaires were first pre-tested on twenty purposively selected members of Bulla Iftin village. The principal investigator then adjusted these semi-structured questionnaires for use.

Semi-structured questionnaires were used to collect quantitative data while checklists and discussion guidelines were used in qualitative data collection. Community members, clients who had benefitted from TBS and traditional bone setters were interviewed using semi-structured questionnaires. The principal investigator and his assistants collected the data using these tools.

5.8.1 Structured interviews on community members

Of the 100 members of the community that had been recruited, 5 declined to give consent. The interviews were done at the homesteads of these community members by the research assistants on each of the 95 participants had a face to face interview with the research assistants after they gave consent. This was a written consent. At the end of the day of interviews, the principal investigator would meet the research assistants and they collate the data and enter it into the computer. An average of 6-10 interviews were carried daily.

5.8.2 Structured interviews on TBS

The four Iftin TBS were all identified by the community gate keepers.

The semi-structured questionnaires focused on the knowledge, perceptions, skills and practices of traditional bone setting. They were interviewed in Somali language and the responses recorded in English. One TBS was interviewed per day. Each questionnaire was reviewed by the principal investigator at the end of each day. The score matrix table 1 was used to extract and score the knowledge and practices from the questionnaires.

Table 1: Score Matrix for knowledge and practice of TBS

Serial Number	Parameter	Scores	Scores	Scores	Scores	Scores
1.	Duration of practice	≤1 year=1	1-2years=2	2-3years=3	3-4years=4	≥5years=5
2.	Classification of fractures	Long/tubular bones=1	Flat bones=1	Small cubical bones=1	Curved bones=1	Cartilages=1
3.	Forms of pain relief	None=0	Herbs=1	Herbs and massage oils=2	Herbs and analgesics=3	Herbs, analgesics and massage oil=4
4.	Assessment of outcome of treatment	Identifies fracture clinically=3	Describes complete recovery=3	Identifies complications=3	Refers in case of complications=3	
5.	Trained anybody in trade	None=0	1=1	2=2	3=3	4=4
6	Licensed by any government authority	Yes=5	No=0			

This score matrix was used to quantify the knowledge and practice of the traditional bone setters and reasons why the community patronises this service rather than seeking for orthodox orthopaedics.

5.8.3 Focus group discussions

Same sex and closely in age focus group discussions (FGD) were conducted with a total of 48 participants in groups of 8 members. They were in cluster age groups of between 21-30 years, 31-39 years, 40-49 years, and those above 50 years. The participants were informed about the study by the principal investigator and informed consent sought before the interview could proceed. There were male focus groups and female focus groups. Trained same sex moderators facilitated the discussions. Members of the community, traditional bone setters and patients with fractures formed the different focus groups. This helped illuminate and support some of the findings in the quantitative data. The proceedings in these focus group discussions were taped in the Somali language. After each session, the research assistants and the principal researcher translated, transcribed and compared information recorded to achieve themes and views presented in the discussion.

5.8.4 Key informant interviews

Key Informant interviews (KII) were carried out by the principal investigator. The District Medical officer of Health was interviewed on his opinions about TBS and the position of the Ministry of Health on utilisation of traditional bone setting and what he taught are the merits and demerits of traditional bone setting in the district. The Member of the County Assembly was also interviewed

on whether he has heard and seen the work done by traditional bone setters. These interviews were recorded.

5.8.5 Case narratives

Two patients who had fractures and were managed by traditional bone setters were identified and encouraged to record/narrate their stories in detail.

5.9 Data processing and analysis

5.9.1 Qualitative data

Data collection from each focus group was taped and notes taken by the research assistants. This was done after the participants gave consent for the tapping and data collection. Immediately after the session, the facilitator and recorder met and a full report of the discussion was prepared which reflected the discussion as completely as possible, using the participants' own words. List of key statements, ideas, and attitudes expressed for each topic of discussion was made. After the transcript of the discussion was prepared, coding of the topics, the participants' statements was undertaken right away. All the data was summarised using a compilation sheet, organising the findings per topic for each group, all the FGDs were allocated numbers and used key words to summarise group statements in the compilation sheet so that it was always possible to go back to the full statement. Since there were different categories of informants, provincial administrators, fracture patients, TBS and other community opinion leaders, male and female, the information was summarised from different groups on separate compilation sheets. Thereafter a systematic comparison between groups on all topics and the objectives and problem analysis diagram as a

framework for analysis and comparison was carried out. Members of the focus group discussion were reimbursed transport of three hundred Kenya shillings.

5.9.2 Quantitative data

As for the structured interviews, the information was gathered, cleaned and analysed by Epi Info statistical package version 3.5.1. A relationship between independent and dependent variables was analysed using chi square and Odds Ratio. The results were presented in figures, such as frequency tables, pie charts, line graphs and bar charts.

5.10 Limitations of the study:

The data may not be generalised for the entire country because of the limited sample and the unique attributes of the community.

Inability to communicate in Somali language and therefore relying on interpreters

The non-probability sampling procedure used has no assurance that every element has some specifiable chance of being included. Sampling error in this type of sampling cannot be estimated and the element of bias, great or small, is always there.

5.11 Minimization of errors and biases

Although the questionnaires were written in English, the research assistants were Somali speaking and the principle researcher understands minimal Somali language, there were issues on translation, observation and sharing knowledge about local customs and practices. To counter this, the principle researcher interviewed some of the respondents and participated in all focus group discussions. Regular research team meetings were also held throughout the study period to

discuss and clarify issues related to data collection and contextual understanding of traditions, culture and semantics. The quality control was ensured by adequate training of the research assistants, pre-testing of the questionnaires, assuring the respondents of the confidentiality of their information, adequate supervision during data collection and cleaning the data before entering it into the computer. Using Cronbach's alpha test, a reliability test for the score matrix used to assess the knowledge and practice of TBS was done. The reliability test was 5.14, implying that the matrix was acceptable and reliable to assess the knowledge and practice of the TBS.

6.0: ETHICAL CONSIDERATIONS:

1. Written ethical clearance to conduct the study was obtained from the KNH/UON ethical committee.
2. The local authorities in Garissa, District Medical Officer of Health in Garissa and the respondents were verbally informed about the study and the objectives of it.
3. Written consent was given by each respondent for structured interviews and in groups for focus group discussions. Those who were illiterate gave their consent using their right thumb imprint. Those who had their photos taken gave consent for this.
4. The confidentiality of the respondents and the community members was kept and the information collected used solely for intended purposes. Identity and names were not included in the questionnaire and they were coded. The questionnaires are safely stored by the principal researcher.
5. Those found with untreated fractures or complications were referred to Garissa provincial general hospital, and they numbered five.

7.0: RESULTS:

7.1 Social demographic characteristics of the community members.

7.1.1. Age:

From October 2013 to May 2014 the study team recruited 95 participants in to the study. 58 were male while 37 were female. The mean age of the participants was 39 years, for women it was 35 years (19-70 years) compared to men where the mean was 41 years with a range of 18 to 84 years. (Figure1). There was no significant difference in age between the male and female participants (p-value 0.9).

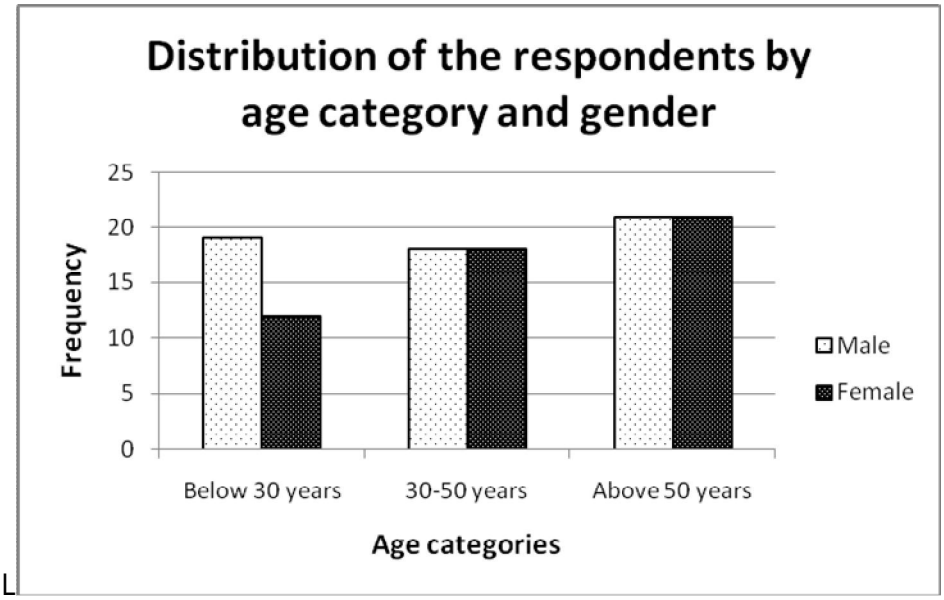


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Figure 2: distribution of respondents by age category and gender

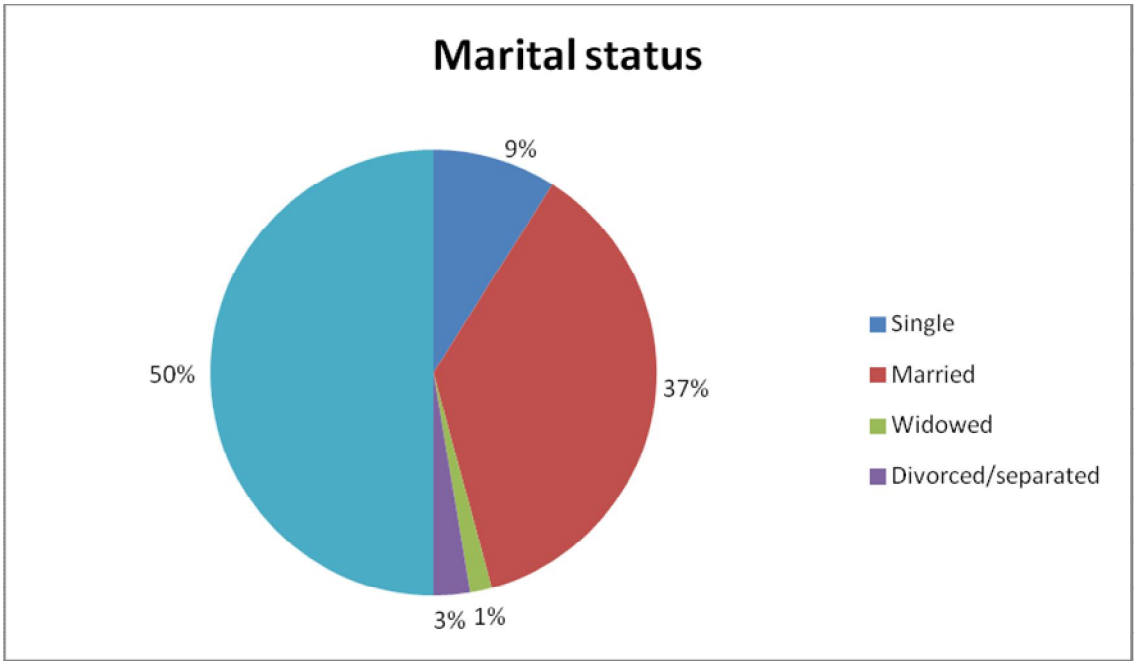

Figure 3: Marital Status

7.1.2. Marital status of community participants

The majority of the study subjects,(74%) were married, 18% single, 5% divorced or separated and 3% widowed (Figure 2). Marital status did not statistically affect the choice of traditional bone setting (see also table 6) as a form of treatment when one had a fracture. (p-value 0.08).

7.1.3. Religion

Table 2: Religion

Religion	Number	Percentage	P value
Muslim	82	86.32	0.001
Christian	13	13.68	

The majority of the participants, 86% were Muslims (Table 2) and there was a statistical significance of Muslims knowing about TBS by fifteen times than Christians. (p value=0.001). Religion was also associated with preference of TBS treatment. Muslims were 22 times more likely to prefer TBS treatment compared to Christians.

7.1.4. Level of education

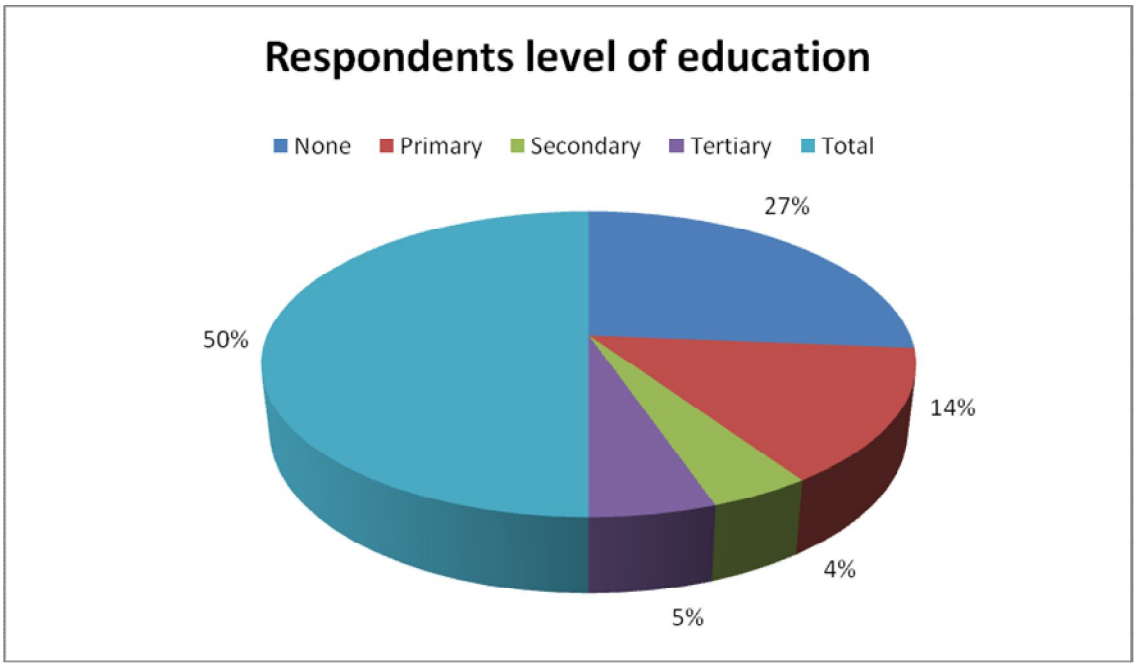

Figure 4 : Respondents'level of education

The level of education was found to be low with a half of the participants having no formal education and only 5% had attained tertiary education. Education was associated with preference of TBS (figure3). Respondents with secondary and tertially education were less likely to prefer TBS treatment. (p value=0.01).

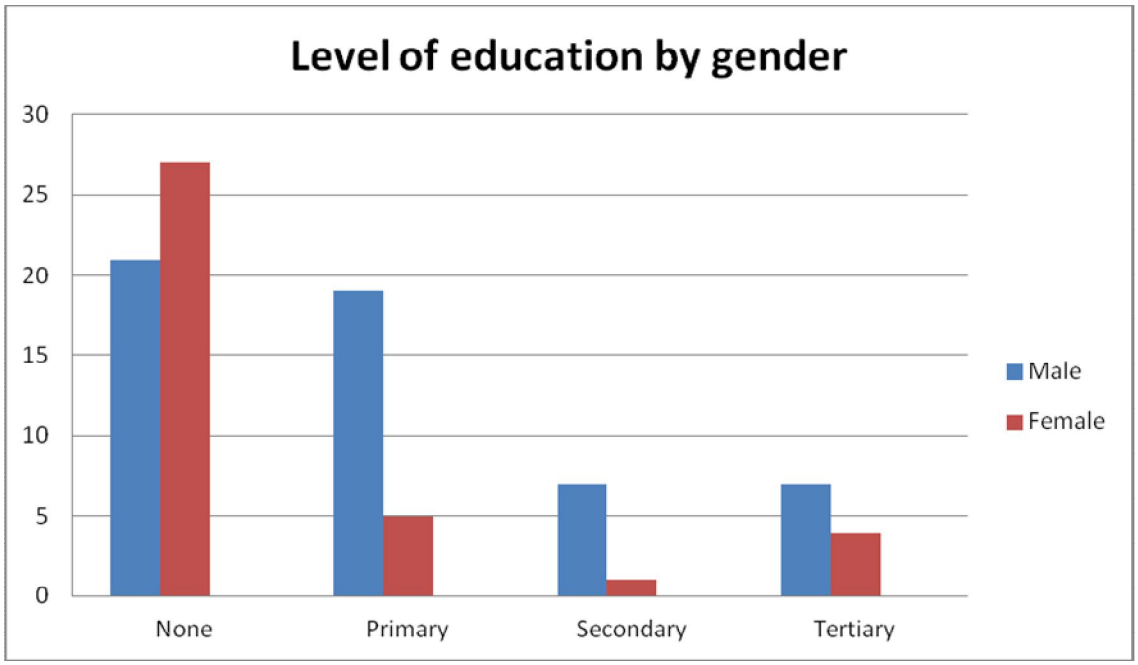

Figure 5: Respondents'level of education by gender

The percentage of female with no education was higher than the male (Figure 4) and there was statistically significant difference in the level of education between male and females (p value= 0.01)**.**

Occupation

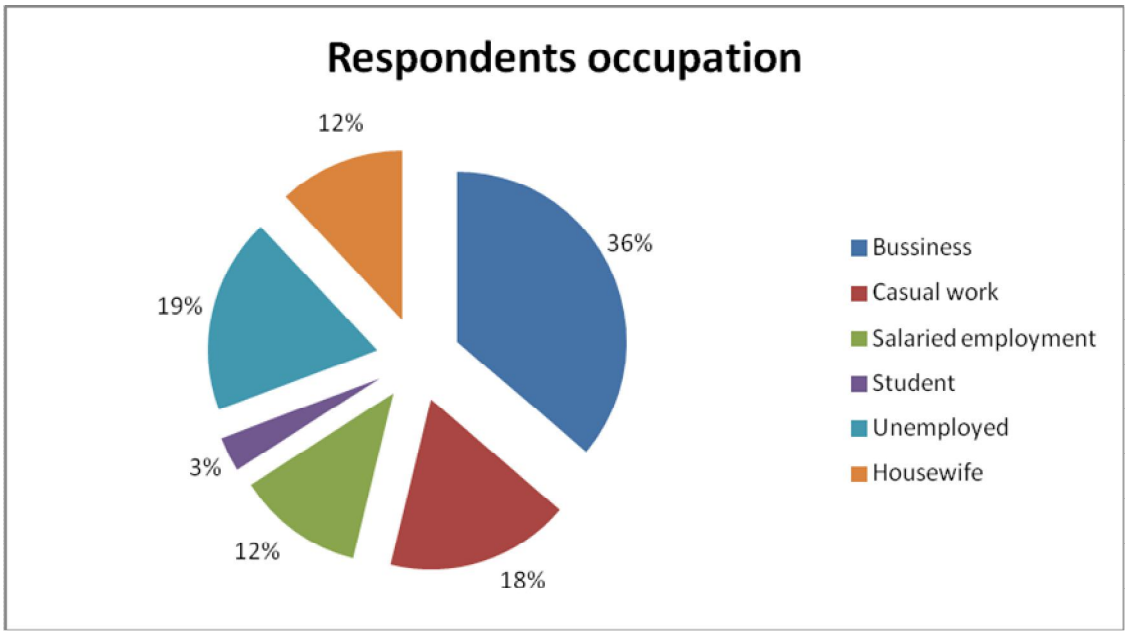

Figure 6 : Occupation of the community participants

Thirty six percent (36%) of the participants were doing business, 17% were casual labourers, 18% were unemployed while salaried employees contributed only 12% (Figure 5). There was no statistical significance on the occupation of the participants and knowledge on TBS. (p value=0.15).

7.1.6. Knowledge and skills in TBS

7.1.6.1. knowledge

Of the 95 participants in the study, 83 (87.3%) acknowledged of having heard about TBS and only 12 (12.7%) had not heard about TBS, with a Cronbach's realibilty statistical test of 1.16. This is highly significant.

The table below summaries the sources of the knowledge of TBS:

Source of knowledge	Number	Percentage
Community education from generation to generation	5	6.02
Relatives and Friends	73	87.95
Neighbours	2	2.41
Radio FM	3	3.61
Total	83	100

Table 3 : Source of knowledge on TBS by community participants

The main source of information regarding TBS was from relatives and friends, contributing 88% (Table 3). The participants were further probed on who provided TBS services and 81 (97.6%) said traditional bone setters, while one said old men and another said government health workers.

7.1.6.2. skills of TBS

Four traditional bone setters were recruited into the study. The four were all male, with age range of 35-70 years (Table 4). A score matrix was used to quantify their knowledge and skills of practice (Adapted from Dada AA 2011).

Table 4: A score matrix on knowledge and skills of practice of TBS

Skill		Score	Maximum expected score	Total scores
Classification of fractures	TBS 1	5	5	**Score** **TBS 1** 32 **TBS 2** 30 **TBS 3** 23 **TBS 4** 23
	TBS 2	3		
	TBS 3	3		
	TBS 4	3		
Duration of practice >5 years	TBS 1	4	5	
	TBS 2	4		
	TBS 3	4		
	TBS 4	4		
Forms of pain relief	TBS 1	4	4	
	TBS 2	4		
	TBS 3	4		
	TBS 3	4		
Assessment of outcome of treatment	TBS 1	9	12	
	TBS 2	9		
	TBS 3	9		
	TBS 4	9		
Trained anybody in the trade	TBS 1	4	4	
	TBS 2	4	4	
	TBS 3	2		
	TBS 4	2		
Licenced by any Government authority	TBS 1	5	5	
	TBS 2	5		
	TBS 3	0		
	TBS 4	0		

The maximum possible score was 35. One TBS scored 32, another 30 and two scored 23.This was subjected to Cronbach's reliability statistical test and the following figures obtained: 1.097, 1.029 and 0.789, indicating that the skills matrix is useful in the assessment.Two of these TBS are fairly well versed with their trade and indeed have licences from the Ministry of Culture. They however,

were not able to refer any of their clients even when complications arose during the treatment. The relatives decide to take away the patient when they were not satisfied with the outcome of the treatment. The two TBS who scored 23 had trained fewer collegues and were not recognised by any Government authority.

There was consesus on the exact treatment offered. After the diagnosis of the fracture has been made, the practitioner cuts two pieces of hard carton box, a piece of cloth or skin(from goat, sheep or camel), a special gum from trees called *Mal mal,*warm water, and animal fat. There is pulling and massaging with the warm water and animal oil until he is satisfied that the two ends of the fracture sites are aligned. Then the hard carton pieces are applied on both sides of the fracture sites and the piece of cloth or skin is applied to fix the carton pieces. In between the carton pieces, *mal mal* is applied and this acts as gum. This is left insitu for ten days when the practitioner opens and checks the progress of the healing. The practitioners also agreed on using some form of analgesia in the form of herbs and sometimes mixed with panadol. In case there is swelling, cuddled camel milk and warm water is used in massaging until the swelling reduces.

Photo No. 1: patient with fracture of tibia by Traditional bone

setter.

This is a patient with a fractured mid tibia on treatment by a traditional bone setter. The patient is accompanied with a relative (Photo 1).

Photo No. 2: Patient with fracture of ulnar on treatment by Traditional bone setter

This is a patient with fractured ulnar on treatment by traditional bone setter.

7.2. Health seeking behaviour of the respondents

Table 5: health seeking behaviour of the respondents (N=79)

Health seeking behavior	**N (%)**
Preferring TBS as first line treatment	67 **(84.81)**
Preferring TBS as first Aid only	1**(1.27)**
Preferring orthodox treatment only	11**(13.92)**
TOTAL	**79(100)**

All the four TBS felt that it is the family/relatives who are supposed to make decisions on the choice of treament. About 85% of the respondents prefered TBS as their first choice in fracture treatment

while another one 1% prefered TBS as first aid before going to orthodox hospitals. Only 14% prefered orthodox treatment as first choice.

7.3. Preferences

Table 6: Reasons for prefering TBS (N=67)

Reasons for patronising TBS	**N (%)**
Cheaper, accessible, quick service, cultural belief and pressure from friends and relatives	**54(68.35)**
Cheaper, accessible	**2(2.53)**
Cultural belief	**1(1.27)**
Accesible	**10(12.66)**
TOTAL	**67(100)**

Sixty eight percent of the respondents felt that traditional bone setting is cheaper, easily accessible,it is a quick service,it is in their cultural belief and pressure from friends and relatives. The accessability, cost, quick service, cultural belief and pressure from friends and relatives were the prominent reasons why they would prefer traditional bone setting as compared with orthodox treatment.

7.4. Knowledge, attitude and practice on traditional bone setting

All FGD groups concured that traditional bone setting is the first port of call. That even those who would not prefer TBS as a form of treatment, agreed to get first aid from the Traditional bone

setters before seeking orthodox treatment. This was complemented by a statement from the FGD *: 'Traditional bone setting is highly patronised because of the belief that it is cheap and that the providers are a talented people in the community who have been set aside by 'god' and if they treat you, you get healed very fast.'*

The community also belief that orthodox hospitals are not able to do closed fracture reduction but only open reduction. One participant who had developed an elbow deformity following TBS treatment said*: "I feared seeking help from the orthodox hospital because I knew they only do open reduction and since I did not want to go to theatre for this open reduction, I went to the TBS for treatment."*

It also came out strongly that the fracture patients have very little role to play when it comes on deciding on the choice of treatment. The decision is done by relatives, family and friends. One participant, 28 years old who had developed complications following TBS treatment remarked:
"My relatives and parents discharged me from an orthodox hospital and took me to a TBS against my wish and now I have these complications. They have now agreed to bring me back to the orthodox hospital which they initially had refused. I have wasted alot of my time and I have suffered with alot of pain.I have advised my age mates against TBS."

They attributed their knowledge about TBS to cultural information from generation to generation through elders. The information also come from those who have benefitted from the service. However, those who have complicated following TBS treatment seem not to have alot of influence on the community decisions as one participant said:

"Once complications have set in, the patient comes to hospital and amputation is done in hospital. This later is turned against the hospital because that is where the amputation was done."

The participants further explained in detail what exactly is done during the treatment. There is massaging, pulling and splintage of the affected part of the body. There was conscesus on the management of pain. The TBS use a mixture of herbs and panadol. In the splintage, pieces of carton and cloth are used and a tree gum called *mal mal* in local dielect is used. This acts as glue and holds together the pieceses of carton and cloth. The fracture site is checked on day ten and subsquently on day 28. If no complications are noted, this is left insitu until healing occurs.

The participants agreed on having seen the following complications following TBS treatment: gangrene, sepsis, shortening of the limbs, stiffness of the joints and malignment. Despite these complications, the participants said they will opt for TBS because of the perception that it is cheap, it is easily accessible, one gets quick service, culturally it is acceptable and the pressure from friends and relatives. One of the participants said:

"Here when you are sick, decisions about your sickness are made by relatives and friends and indeed the community at large. You know the community will assist in paying for the treatment once they have participated in the decision making on your your choice of treatment."

The cost of treatment by a traditional bone setter ranges from Kenya shillings five thousand to Kenya shillings ten thousand depending on the severity of the fracture. However, one traditional bone setter admitted of having charged Kenya shillings thirty thousand for the treatment of

fractured pelvis. Comparatively this is much more expensive than orthodox hospital treatment, hence, cheapness is just but a perception.

7.5. Knowledge and practice of skills by traditional bone setters

Traditional bone setters do not keep records and therefore they were not able to quantify the number of patients they have seen. However, one said: *"I see a client on a daily basis".* The Traditional bone setters unonimously agreed that the most difficult fractures to treat are fractures of the neck of femur, fractured hip joint and fractured clavicle.

The knowledge of these practitioners was assessed using a score matrix which enquired on the duration they have practiced, whether they are able to classify fractures, what they use to relief pain, how they assess the outcome of the treatment, whether they have trained anybody in their practice and whether they are licenced by any Government authority. The maximum total score was 35. One TBS scored 32, another 30 and two others scored 23. By and large all the four were above average in their knowledge. Suprisngly they knew different bones like collar bone, thigh bone, hip and fore- arm bones and leg bones. Two were licensed by the Ministry of Culture and Social Services. The other two who scored 32 and 30 respectively, have trained other TBS and are considered the senior most practitioners in the community.

The TBS were able to define when a patient has a fracture. They identified the following as the cadinal signs of a fracture: pain at the site, swelling of the affected area, redness of the affected area, rotational deformity at the affected site, crepitus at the affected site, loss of function of the affected part and presence of a gap on the said fractured bone.

They went further and defined the criteria they use on a healed fracture: there is absence of a gap between the broken fragments, there is minimal deformity of the affected body part and the return of painless movements of the affected part. They identify complications when they notice swelling of the affected part increasing, there is change of skin colour, there is fever and there is foul smelling discharge at the affected site. However, despite noticing these complications, they rarely refer the patients. It is the relatives and family members who when not sastified with the treatment seek for second opinion elsewhere and most likely will go to orthodox hospital for the second opinion.

7.6. Attitude of the community towards traditional bone setting:

The Iftin community overwhelmingly prefer TBS. Eighty six percent of the community is Muslim and are strongly of the opinion that TBS is good and should be given a chance in the modern society. Only 5% of the interviewed had attained tertiary education. Those with tertiary education seem to opt for orthodox treatment rather than traditional bone setting.

The traditional bone setters offer other forms of treatments including traditional tonsillectomy, tooth extractions, male circumcisions, tongue tie excisions and facial nerve palsies. One participant remarked: *"traditional bone setting is more effective than the modern hospital treatment."* The training runs in families where the trainees are mainly relatives of the trainer and it is an open secret that the trade should run within the families. The community consider these families special and believe the gods have special favour for them and therefore their form of treatment is much superior than the orthodox treatment.

7.7: Key informant interviews(KII)

The District Medical Officer of Health (DMOH) and Member of County Assembly (MCA) were interviewed. The DMOH agreed that TBS were doing some work on the management of fractures and dislocations but he was not very clear on the magnitude of the number of patients they manage because they do not send any returns to his office. He was not able to identify any of the TBS but he agreed of their existence. He therefore admitted that his office does not regurate the TBS activites. He however denied on having witnessed any patient on treatment by traditional bone setter.

The MCA supported the work being done by the TBS. He admitted of having even taken patients with fractures for treatment there. But when asked if he himself will opt for treatment from a TBS if he developed a fracture, he declined. His opinion is that the TBS should be supported by the county government and their service should be appreciated by all. He said he is drafting a bill to be discussed in the county governement on traditional bone setting and other traditional healers. However, he did not want to give the details of this bill.

7.8: Case narratives

This was a narration of a 27 year old female who had an injury to the left leg. She slipped and fell with twisting of the ankle joint. This happened in October 2012. *She had the following narration: I was in a lot of pain following the fall, with my leg turning towards one side. My parents and my brother carried me to a nearby traditional healer who specialised in treating bone injuires. The "doctor"examined me and declared to me and my parents that part of the bones of the leg were broken and the joint was also in bad shape. He advised that I must be admitted at his place and*

stay there as he treats me. The parents were told to give a down payment of Ksh 5000. This they did and treatment started. I was given some herbs which I was told will relieve the pain. I was also given some tablets for pain relieve. The "doctor" with the help of an assistant massaged the area with maximum pain and pulled the foot while the assistant pulled the leg slowly until there was some alighnment of the foot and the leg. The "doctor" applied animal fat during the massaging. The leg was very swollen and in a lot of pain, but he asssured me that swelling will come down after awhile and therefore I should be patient.After he achieved the alighnment, he cut two carton boxes of equal length. These were applied on both sides of the joint, reaching at the upper part of the leg and touching the sole of the foot. Warm water mixed with a traditional tree gum called in the Somali dielect "mal mal" was applied at the inner side of the carton in contact with the skin. This was then tied together with a piece of cloth. The leg was slightly raised up with the help of a small stool. I was allowed to feed after this procedure. The "doctor" checked the leg after three days. He removed the carton boxes. He said he was checking for any change of skin colour, any unusual smell or any more swelling than it was before. He assured me that all was well and returned the cartons with warm water and "mal mal" applied again the same way he had done earlier. He again checked on day ten and the same procedures were done again. The same was again checked on day 28 of the treatment. I requested to know the type of injury I had and the "doctor" told me that the big bone of the leg was broken towards the ankle joint and the joint was also twisted. He said this kind of injury will require the splint age with the cartons for 50-60 days. Therefore I will have to stay at his place for that long before he can decide to release me. During the stay I was treated well, I was fed, though some times my parents would bring food from my home. After day 28, I was allowed to stop elevating the leg but not allowed to walk. After the 50th day,the cartons were removed and I was allowed to move around with suport for three months. I was discharged to my

home. On the fourth month, I started walking without support and was allowed to start some small bussiness of rearing chicken. I then realised that my ankle joint was deformed and I started experiencing the pains on the same joint. I decided to seek another opinion from that of the orthodox doctor. The hospital doctor at Garissa provincial general hospital examined my leg and after carrying out x-rays of the leg and joint, he told me that I have a frozen ankle joint with what he called dosiflexion deformity. He went further to explain that these deformities can only be corrected by surgery. I fear going to theatre, and I would rather stay with these deformities for live rather than going to theatre."

A second narrative was from a father of a ten year old boy who fell from a tree and sustained a fracture of the right mid arm. This happened in December 2012. The father took the child to a traditional bone setter who confirmed the fracture of big bone of the fore arm and commenced treatment. *The traditional healer with the help of his assistant manipulated the fore arm using massage with animal fat and warm water, pulled and the fractures ends aligned. Two carton boxes with aid of a local herb call Mal Mal and a piece of cloth were applied on the fracture site. The carton ends were in two portions: one portion reaching the elbow joint in 90% flexion and the wrist joint, while the other portion strated from the elbow joint upto the mid arm. The traditional bone setter opened the carton boxes on the tenth day to check for any complications but found none and re-applied the same. This was again checked on the twenth eight day. I was qurious on which complications he was checking for and he explained that he was checking for any excessive swelling, any change of skin colour and development of foul smell. He reassured me that all was going on well. The cartons, Mal Mal, a piece of cloth and warm water were the ingredientes used during the treatment and the child was given panadol during the first ten days. These were left*

insitu for three months and the child completely healed without any deformed or angulation of the fore arm. The father brought the child as evidence of the narration. Indeed, examing the child, there were no deformities noted on the fore arm and the child was using the arm and able to do all movements of the fore arm-suppination and pronation The sensation of the fore arm was also intact. Indeed this was a success story of a child who has been sucessfully treated by a traditional bone setter following a fracture of the Ulnar of the right fore arm.

8.0 DISCUSSION:

Traditional bone setting is a service that is readily available in Iftin Division of Garissa County. It is a first port of call to 90 percent of patients with fractures and dislocations. This is almost similar to a study done in Nigeria where 85% of the participants had traditional bone setting as a first port of call (Omolulu, 2008). Other studies done in Kenya indicate that 80% of Kenyans seek services of traditional healers (Nyamwaya D, 1992).

In the study period of October 2013 to May 2014 the number of participants recruited was 151. Ninety five participants represented the community of which thirty seven were females while 58 were males. There were six FGDs with eight members each. Of the six, two were women FGDs and four were male FGDs. All four TBS of Iftin were recruited into the study during this period. The other remaining participants included 2 case narratives and two key informants.

Religion was associated with preference of TBS treatment. Muslims were 22 times more likely to prefer TBS treatment compared to Christians (Chi-square 11.7, p-value 0.01). Though this is a

predominantly Muslim community, comprising 86% of the participants in the study, none of the Christians preferred TBS treatment. This was a new finding and not yet cited elsewhere.

Age, gender, marital status and occupation of the participants statistically did not affect the choice of TBS treatment. The younger age groups seemed to prefer TBS treatment as compared the older age groups. This could be because of the low level of education even in the younger age groups. Other studies elsewhere indicate that the youth do not seem to prefer TBS as a form of treatment. (Omolulu, 2008).

There was low level of education in Iftin. Eighty one percent of the participants had none or primary level of education. The females contributed largely to those with no formal education. This agrees with the state of the girl child education in this county. Respondents with secondary and tertiary education were less likely to prefer TBS treatment, (Chi-square 8.85, p=0.01). This study agrees with other studies elsewhere that the level of education influences the choice of treatment between orthodox and traditional bone setting (Agarwal A, 2010). The community members are conservative and have not been influenced by the urban way of live despite Iftin being in the sub-urban regions of Garissa town. They marry the girls off at an early age. The formal education of the community needs to be addressed.

All the four bone setters of Iftin acknowledged that they treated other ailments other than fractures and orthopaedic cases unlike other traditional bone setters cited elsewhere who have specialised on fractures and orthopaedics (Dada AA, 2011). For example the TBS of Ijaw, Nigeria treat only fractures and orthopaedic cases.

The four traditional bone setters of Iftin are indigenous to the area and the community identifies with them. This is different from a study done in Calabar, Nigeria where some traditional bone setters who were not properly trained were noted to have moved from the rural to the urban areas with the sole purpose to enrich themselves. They were patronised by unsuspecting "patients". These mobile practitioners sometimes do not know anything about traditional bone setting. They are people who unable to cope with the present economic situations, resort to this "trade" (Udosen AM, Otei OO, 2006). They perhaps are in business because most Africans somehow have faith and confidence in traditional treatment. However the TBS of Iftin are well known within the area and are acknowledged by Iftin society to be their own and not people from elsewhere who have migrated to their area for the sole purpose of economic gain.

The TBS and FGDs described in detail the treatment procedures. The procedure includes massaging, pulling and splinting. The splinting is done with the readily available materials such as carton boxes and old cloths. These are brought together with a local herb called *Mal mal* which acts as glue. The *Mal Mal* is believed to act like the plaster of Paris that is used in orthodox hospitals, though with less adhesiveness and hardness. There are other herbs used in pain relief. Previously camel skin and rattan sticks were used but they are no longer used. Massage and manual traction of the affected bone is part of the treatment. This is done before splinting the fracture. Unlike the Nigerians who by way of scarification, sacrifices and incarnations treat fractures that fail to heal, the Iftin TBS do not carry out these practices. They either consult the senior most TBS or because of the impatience of the relatives, the patient is taken to the orthodox hospital for further treatment. The Iftin community do not believe that witchcraft causes fractures nor causes poor healing of the fractures during treatment.

The TBS are able to classify the different types of bones like flat bones, small bones, cubical bones, curved bones, long bones and tubular bones. This is a high level of knowledge on traditional bone setting according to Susrutha (Bali Y, 2012) .The TBS were able to describe on how to make a fracture diagnosis and on how to tell when treatment has been achieved. Indeed they concurred that treatment is achieved when there is absence of gaps between the fracture fragments, there is no shortening deformity, and there is return of painless movements. However, the Iftin TBS were not able to classify dislocations the way Susrutha has described them. As in Nigeria, one of the most important flaws of the practice of TBS is the process of training and acquiring skills, which is not formal, undocumented and uncontrolled with attendant continuous decline in imparted knowledge and hording of information. (Udosen AM, Otei OO, 2006).

The study revealed that one of the most important flaws of the practice of TBS is the process of training and acquiring skills in bone setting, which is not formal, undocumented and uncontrolled with attendant continuous decline in imparted knowledge by hoarding of information. Furthermore, the practice is passed on by oral tradition and there is no regulation, review and even peer criticism. Quality is therefore not guaranteed and complications are high. This is unlike orthodox training, which is regulated, open and subject to regular review on the basis of new evidences. It was evident in this study that those trained in the trade are blood relations of the older TBS and an outsider from the family cannot be trained into the trade.

Health care can no longer be carried out under the cloak of secrecy. Some traditional knowledge have in the recent past become disclosed as a result of codification (that is, formalization in written form), wide use or through collection and publication by anthropologists, historians, botanists or

other researchers and observers (Koning M, 1998). However, in comparison to the situation in Asian countries such as India and China where a lot of indigenous medical knowledge has been disclosed through use and publication, (Bali Y, 2012) disclosure of traditional medical knowledge remains relatively limited in Garissa and Kenya as a whole. In China, Chinese-style doctors are trained in care of diseases including pain control, fracture and sprains management. The practice is regulated and practitioners undergo structured training resulting to minimal complications. (Garba ES, 1988). In Turkey, practitioners have been trained to refer difficult cases. (Dada AA, 2011).This practice of knowledge transmission and archiving and referral system can be borrowed and practised in Garissa and indeed Africa.

The TBS in Iftin did not attribute the complications that occur to spiritual explanations. The Ijaw of Nigeria are cited to attribute complications of fractures to mystical forces. (Sofowara A, 1982).This has no basis. While there may be some very small cases of illnesses with mystical explanations, most illnesses have scientific explanation/causation. For example, the Ijaw of Nigeria connects between the broken leg of a chicken and the eventual treatment of a patient with a broken bone which is difficult to explain. (Udosen AM, Otei OO, 2006). In western medicine, scientific explanations are provided on how a particular drug works with the body chemistry, in that wise, one cannot expect the west and indeed non-Africans to accept any kind of cure or advances in medicine and surgery by Africans without adequate explanations. (Onuminya JE, Onbowale BO, Obkpa P, 1999).

Traditional bone setting can be considered as Folklore. Folklore in its broadest sense is referred to as a set of literary, artistic, religious, scientific, technological and other traditions and productions

which are transmitted from generation to generations. It may include literary works of any kind, oral, or written such as tales, legends proverbs and myths. It includes music, religious traditions and ceremonies. Folklore has traditionally been approached from a copyright perspective. However, while copyright may be relevant to protect some aspects of Folklore such as literary, musical and artistic works, the technological and methodological content of Folklore such as inventions, craft, designs and carvings may not be protected. (Kimani VN, 1995). Traditional bone setters consider themselves as Folklore and therefore view orthodox orthopaedic practitioners as intruders into their trade and business, (Udosen AM, Otei OO, 2006) making the interaction between the TBS and orthodox practitioners rather challenging and therefore has to be tackled with a lot of tact.

Ninety nine percent of community members admitted of having heard about traditional bone setting. The source of information was mainly relatives and friends and indeed the community knew who provides this service and to which specific ailments the traditional bone setters treat. The community members specifically said TBS treat fractures and orthopaedic diseases though the TBS themselves said they treat other ailments other than fractures and orthopaedic disorders. On probing the community members further on regarding where they had obtained information about the TBS, they overwhelmingly said that the elders in the community were responsible for the information. Ninety five percent of the community members who participated in this study went further and explained in detail what they thought constituted traditional bone setting. This same proportion of the participants explained the reasons for patronizing traditional bone setting. These reasons included low cost, accessibility, quick service, cultural belief and pressure from relatives

and friends. The findings agree with another study that was done in Nigeria (Thanni LOA, Akindpe JA, 2000).

However, utilization of incantations and concoctions as part of the treatment which influences patronising of traditional bone setting in Nigeria was not part of the findings at Iftin. However, the Iftin community members believe that TBS are special people set aside by their gods to take care of the fractures and orthopaedic ailments of the community members.

Though patronage of the TBS is influenced by cost, accessibility, turnaround time, culture pressure from friends, cost is the perceived as a major factor. The mode of payment is characterised by use of multiple little instalments and payment in kind with live animals. Although cost is perceived as a major reason to patronage of TBS, some of the services offered by TBS were charged as much as thirty thousand Kenya shillings, a fee that is relatively higher than orthodox treatment cost.

As cited in the study, the reasons for patronage of the TBS include easy accessibility and quick service rendered by the TBS compared to hospitals where there are protocols and queues before patients can be seen. The health system is not adequate to cater for needs of the patients, for example Iftin Sub-district hospital was a health centre that was recently elevated into a Sub-county hospital and has shortage of resources and facilities to manage fractures. Participants in the FGD pointed out that they were not happy with the orthopaedic and fracture services offered in this hospital. The nearest alternative hospital is the Garissa Provincial general hospital where the queues are long.

In contrast to the Asian situation, traditional medicine in Kenya remains non-codified and includes what has generally been termed “folk”, “tribal”, “rural”, indigenous” and in Garissa,” badia”, which has been handed over orally from generation to generation in communities. They are generally based on traditional beliefs, norms and practices based on centuries old experiences of trials and errors, successes and failures at the household and community level (Adebule GT, 1991) and (Kimani VN, 1995). Thus a significant part of traditional medicine in Kenya remains a secret. In specialised areas, such as knowledge held by bone-setters, access is restricted to certain classes of people- close relatives. (Nkele CN, 2000). Though considered as a custom for those in *badia,* traditional bone setting is highly patronised in a semi- urban setting of Iftin. This means that though the community migrated from the *badia* setting, they have not changed much in terms of their health seeking behaviour for treatment of fractures and dislocations.

Strong social and family ties still exist. Friends and family are therefore an important group on the choice of the type of treatment an injured or sick relative will receive. Despite the complications that have been sited, friends and relatives are the ones who make decisions on the type of treatment to be sort. As one participant remarked in the case narratives: *“I could have opted for orthodox treatment from the time of injury rather than coming now when the complications have set in, only that it was my parents and elder brother who made the initial decision on the choice of treatment”.* The following complications were noted on the case narrator: joint stiffness, shortening of the limb and angulations. Other studies elsewhere agree with this study on these complications. (Onuminya JE, Onbowale BO, Obkpa P, 1999).

9.0 CONCLUSIONS

Knowledge on traditional bone setting by the Iftin community from this study was good at 95% and comparable to those other studies in other developing countries, however the transmission and archiving of the knowledge on TBS in Iftin does not exist.

The community members linked TBS to their cultural heritage and embraced it and understood the procedure of traditional bone setting. The community believed that the orthodox form of fracture management was time consuming, and tied it to prolonged and expensive hospital protocols and procedures.

Low level of education, Muslim religion, influence by family and friends determined the preference for TBS in Iftin. While other factors such as gender, marital status and age did not influence the preference for TBS.

While the community perceived low cost as a major influence on the choice of TBS, some charges by TBS were relatively high compared to the orthodox treatment costs.

Although TBS practice had no formal documentation and training, their skills and knowledge on bone setting was reasonable and quantifiable.

Some serious forms of complications were noted to occur following traditional bone setting such as joint stiffness, shortening of the limb, angulations, osteomylitis and gangrene leading to amputation.

10.0 RECOMMENDATIONS

Traditional bone setting arose as an adaptive approach to injury care. With the advent of new technologies and advancements in medicine traditional fracture care evolved into what we recognise today as contemporary orthopaedics. However in developing nations where advances in medical technology have been disjointed and non-equally distributed, the traditional and contemporary approaches have been forced into disharmonious coexistence. The practice of traditional bone setting at Iftin cannot be ignored and I suggest that:

1) A collaborative effort on the part of governments, professional orthopaedic societies, private/charitable organisations and traditional healers is needed to integrate modern fracture care in Garissa County. I support the notion that further integration between traditional and western practises will ultimately provide sustained long-term improvement of outcomes after musculoskeletal injuries and prevent complications.
2) Once awareness and understanding has been reached between bone-setters and orthopaedic surgeons, local and regional hospital can then implement training programs. It is important however that these programs do not seek to eradicate the fundamentals of traditional practices, but rather introduce compatible elements of contemporary fracture care. For example, all bone setters should be taught to refer open wounds to local hospitals. The overarching goal of any bone setter training program should be that the bone setters understand which fracture types to treat and which fracture types to refer to hospital. Under this model, the traditional bone setter will continue to serve as the primary point of contact for many patients.

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12.0 APPENDICES

12.1 CONSENT FORM- APPENDIX I

Knowledge, Attitudes and Practice of Traditional Bone Setting in Iftin Division, Garissa District

Introduction.

I'm Julius Rogena, a postgraduate student at School of Public Health, University of Nairobi, carrying out a study to assess the knowledge, attitudes and practice of Traditional Bone Setting at Iftin, Garissa District. This is a traditional way of fixing fractures. The study is towards the part fulfillment of attaining Master of Public Health of the University of Nairobi.

What is the purpose of this study?

The purpose of this study is to determine the socio-demographic characteristics of those who utilize this service, to establish knowledge and skills of traditional bone setters, to determine health seeking behavior of patients with fractures and to find out to what extent traditional bone setting is utilized in Iftin. I will also find out factors that influence utilization of traditional bone setting.

Who will participate?

- Community members aged 18-80 years will be randomly selected from the Iftin Division.
- 10 clients known to have had fractures in the last six months and underwent TBS
- At least three prominent traditional bone setting providers

However, the following will be excluded from the study

- Participants who have stayed in Iftin for less than six months
- Participants below or above the 18 years and 80 years respectively
- Those who do not consent to participate in the study

What will be the procedure for data collection?

- Structured questionnaire will be used to collect quantitative data while checklists and discussion guidelines will be used in qualitative data collection.

- The structured questionnaires will focus on knowledge, perceptions, skills and practices of traditional bone setting.
- The questionnaires will first be pre-tested and administered by trained interviewers, fluent in Somali language selected from members of the community.
- Same sex focus group discussions will be conducted in groups of 8 participants. Trained same sex moderators will facilitate the discussions.
- The proceedings in these focus group discussions will be taped.
- After each session, the research assistants and the principal researcher will translate and transcribe the tapes
- Key informant interviews with representation from major stakeholders- District Medical Officer of Health, religious leaders, chiefs and a traditional bone setter.
- One to two patients who have had fractures and managed by traditional bone setter will be identified and encouraged to record/narrate their stories in detail.

Risks, benefits and reimbursements

- People who are going to benefit from this study are all nomadic patients who may develop fractures. In the nomadic setting, keeping up with the appointments in conventional hospitals is a challenge to patients and if traditional bone setting will be an alternative then they are going to immensely benefit. The Kenya government is in the process of recognizing traditional health practices and systems and yet there is no proper documentation of some of these practices.
- In this study we are trying to document who utilizes traditional bone setting, how this service is practiced and whether there are any lessons why patients will prefer TBS as compared to orthodox orthopedics.
- The study will benefit those with fractures. Those who may have developed any complications following traditional bone setting will be helped to have the complications rectified at Garissa Provincial General Hospital.
- It will also guide the ministry of health in policy formulation on traditional bone setting.
- The participants in focus group discussions will be reimbursed transport of Ksh 200/=

Confidentiality and Voluntary Participation

- Participating is voluntary; your decision shall in no way affect the treatment that you may receive.
- You may withdraw from this study at any time without having to give an explanation and this will not affect your future care or treatment.
- All the information about you will be treated in strict confidence and you will not be named in any written work from this study.
- Any audiotape material of you will be used solely for research purposes and will be destroyed on completion of this research.

I solemnly declare that I have read and understood all enclosed information about this study and I'm aware of the procedures and processes therein. I agree to participate in this study on my own free will and not under any kind of intimidation or coercion.

Should you have any concerns about the way the study is being conducted, please contact the secretary of the Ethics and Research Committee-KNH/UON on telephone number 020 2726300 ext. 44102 or my supervisors at UON= School of Public Health, Prof. Violet Kimani, Rose Opiyo and Dr Dismus Ongore. My contact telephone is 0722838686

Name----------

Sign----------Date----------

Or Thumb print----------

Witness----------

Sign----------Date----------

12.2 SEMI-SRUCTURED QUESTIONNARE- APPENDIX II

SOCIO-DEMOGRAPHIC DATA

1.1 Name of village----------

1.2 Sex of respondent

A) male

b) Female

1.3 age of respondent in years

a) 10-19

b) 20-29

c) 30-39

d) 40-49

e) 50-59

f) >60

Indicate actual age of respondent----------

1.4 What is your religion?

a) Muslim

b) Christian

c) Traditional

d) None

e) Others specify----------

Indicate actual religion of respondent----------

1.5 Level of Education

a) None

b) Primary

C) secondary

d) Tertiary (colleges and university).

Indicate level of education of respondent----------

1.6 Social status

a) Single

b) Divorced/Separated

c) Widowed

d) Married

Indicate social status of respondent----------

1.7 What is your occupation?

A) Unemployed

b) Student/Pupil

c) Casual work

d) Self employed (income generating project).

e) Community Health Worker/ Counsellor/ Home Visitor

f) Traditional Bone Setter

g) Salaried employment

Indicate exact social status of respondent----------

PART 11

KNOWLEDGE OF TRADITIONAL BONE SETTING BY THE COMMUNITY MEMBERS

1.8 Have you ever heard of the phrase "Traditional bone setting?"

a) Yes

b) No

1.9 If yes, in question 1.8, from which sources did you hear about it? (Tick against sources mentioned spontaneously)

a) Hospital/Health Centre workers

b) Newspapers/Magazine/Posters/ etc

c) Mosque

d) Relatives/Friends

e) Spouse/Parent/Child

f) Community Health workers from mosque

g) Community Health workers from health centres

h) Community health workers from NGOs

I) Provincial administration: chief, assistant chief.

j) Others specify----------.

2.0 Who provides traditional bone setting in this location?

a) Government Health workers

b) Community Based Organizations

c) Traditional Bone Setters

d) International Organizations

e) Community health workers.

f) Others specify----------

2.1 Traditional Bone Setting activities are directed to which disease(s)?

a) Injuries

b) Malaria

c) Congenital deformities

d) Others specify----------

2.2 If the answer in 2.1 above is injuries, then are the people you know with injuries in this location aware about these services?

a) Yes

b) No

2.3 Are the people in your community educated about traditional bone setting?

a) Yes

b) No

2.4 If yes in 2.3 above, how were/are the people educated about traditional bone setting?

a) Leaf lets/pamphlets/booklets and other information materials

b) Mosque

c) Community health workers of CBOs/government/mosque

d) Madras

e) CORPS

f) Others specify----------

2.5 From your own knowledge, what do you think constitutes Traditional Bone Setting?

a) Praying for the sick

b) Good nutrition

c) Massaging/pulling and splint age

d) Nursing the sick

e) All the above

f) Surgery

g) Others specify----------

2.6 Why will you prefer traditional bone setting?

a) It is cheaper

b) Easily accessible

c) Quick service

d) Cultural belief

e) Pressure from friends and relatives

f) I am assured of utilisation of incantations and concoction

g) All the above

2.7 What exactly is done during the massage: prop----------

2.8 What exactly is done during the splint age: prop----------
---

KNOWLEDGE OF TRADITIONAL BONE SETTING BY THE TBS PRACTITIONERS

2.9 How long have you practiced:

a) Weeks

b) Months

c) Years

2.9 Who trained you

a) my parents

b) gift from the gods

c) TBS but not related

2.11 How do you know that a patient has a fracture?

a) Pain at the site

b) Swelling of the area affected

c) Redness of the affected area

d) Rotational deformity at the affected site

e) Crepitus at the affected area

f) Loss of function of the affected part

g) Presence of a gap on the said fractured bone.

h) All of the above

i) None of the above

j) Others specify----------

2.12 How do you know that the fracture has healed after the application of traditional bone setting?

a) Absence of a gap between the broken fragments

b) No deformity of the affected body part

c) Return of painless easy movements of the affected part

d) All of the above

e) None of the above

f) Others specify----------

2.13 How to you identify that complications have set in during the treatment?

a) Swelling of the affected part increasing

b) There is change of skin colour

c) There is fever

d) There is foul smelling discharge at the affected site

e) All of the above

f) None of the above

g) Others specify----------

2.14 What do you do if you think complications have set in?

a) Refer the patient

b) Sweet talk the patient that all will be well

c) Blame the patient and his relatives

d) Blame the ancestral spirits

e) Change treatment

f) Others specify----------

2.15 What do you think are the advantages/benefits of Traditional Bone Setting?

a) It is cheap

b) Easily accessed

c) It is quick service

d) It is part of our culture

e) There is utilisation of incantations and concoction

f) All the above

g) Others specify----------

2.7 Have you ever discussed traditional bone setting with other people?

a) Yes

b) No

2.8 If yes, with whom?

a) Relatives

b) Friends

c) Religious leaders

d) Community leaders

e) Staff of CBOs/Health centres/Mosques

f) Others specify----------

2.9 In your opinion, who is supposed to make decisions related to traditional bone setting?

a) Patient

b) Family/Relatives

c) Health centre staff

d) Religious leaders

e) Community leaders

f) Traditional bone setter

g) Others specify----------

12.3 FOCUSED GROUP DISCUSSION- APPENDIX III

INTRODUCTION

The facilitator will greet the participants and initiate introduction of him/her and all members of the group will say their names. The facilitator will then introduce the subject of discussion to the members and its importance

A) QUESTION ANSWER SESSION

The facilitator will put across questions relating to knowledge and practise on traditional bone setting:

i) Knowledge on traditional bone setting---provider, how diagnosis is made, specifically what is done in the treatment, any complications and how once they occur are handled, how is pain relieve done

ii) Attitude-personal perception on this form of treatment, reasons why the community patronage this service

1 2.4 KEY INFORMANT INTERVIEW (KII) -APPENDEX IV

The following questions will guide on the in-depth interview:

1.1 Introduce yourself- name, age and social status

1.2 What is your belief in religion?

1.3 What is your education level?

1.4 What do you for a living?

1.5 What do think of traditional bone setting and traditional bone setters?

1.6 Describe what you have seen done on a patient with either a fracture or a dislocation by a traditional bone setter.

12.5 Key informant interview guide for Traditional bone setters- APPENDIX V:

Guiding questions:

i. Introduce yourself—name, age and social status; how long have you practised?

ii. What is your belief in religion?

iii. What is your level of education?

iv. Other than offering traditional bone setting, what else do you do?

v. How did you get your training?

vi. How do you confirm that your client has either a fracture or a dislocation?

vii. Describe what you do to your client when you realise he/she has a fracture/dislocation

viii. How do you manage pain?

ix. Why do you think clients come to see you?

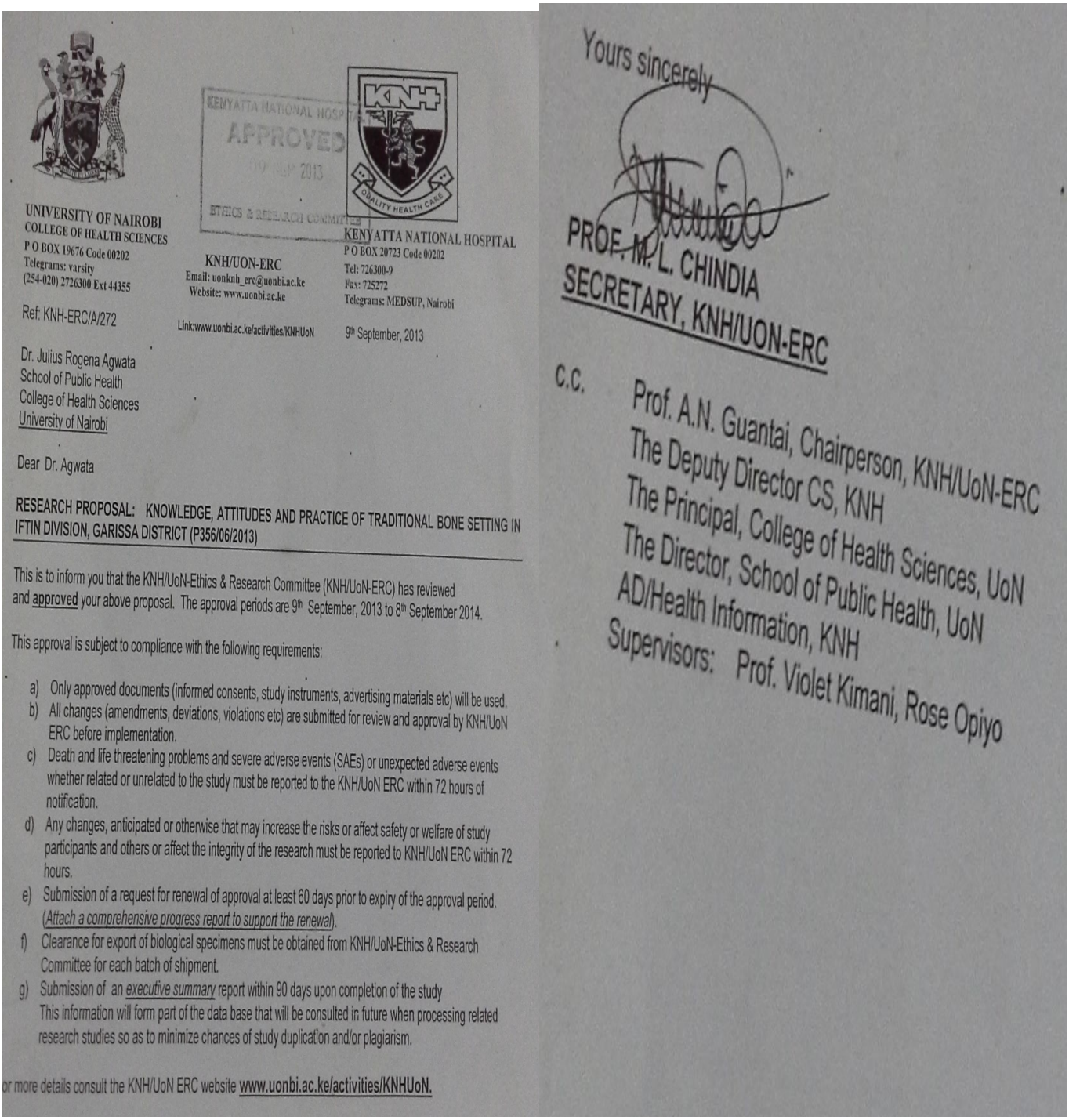
x. How do you confirm that they have been fully healed?

xi. Do complications occur and if they do, what do you do to these clients?

xii. Briefly describe the most challenging client you have ever treated.

Thank you for having participated in this study and May God bless you.

12.6 LETTER OF APPROVAL FROM THE KNH/UON ERC- APPENDIX VI



UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
(254-020) 2726300 Ext 44355

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

KNH/UON-ERC
Email: uonknh_erc@uonbi.ac.ke
Website: www.uonbi.ac.ke
Link:www.uonbi.ac.ke/activities/KNHUoN

KENYATTA NATIONAL HOSPITAL APPROVED 2013 ETHICS & RESEARCH COMMITTEE

Ref: KNH-ERC/A/272

9th September, 2013

Dr. Julius Rogena Agwata
School of Public Health
College of Health Sciences
University of Nairobi

Dear Dr. Agwata

RESEARCH PROPOSAL: KNOWLEDGE, ATTITUDES AND PRACTICE OF TRADITIONAL BONE SETTING IN IFTIN DIVISION, GARISSA DISTRICT (P356/06/2013)

This is to inform you that the KNH/UoN-Ethics & Research Committee (KNH/UoN-ERC) has reviewed and approved your above proposal. The approval periods are 9th September, 2013 to 8th September 2014.

This approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b) All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH/UoN ERC before implementation.
c) Death and life threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH/UoN ERC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH/UoN ERC within 72 hours.
e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
f) Clearance for export of biological specimens must be obtained from KNH/UoN-Ethics & Research Committee for each batch of shipment.
g) Submission of an *executive summary* report within 90 days upon completion of the study This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/or plagiarism.

or more details consult the KNH/UoN ERC website **www.uonbi.ac.ke/activities/KNHUoN.**

Yours sincerely

PROF. M. L. CHINDIA
SECRETARY, KNH/UON-ERC

c.c. Prof. A.N. Guantai, Chairperson, KNH/UoN-ERC
The Deputy Director CS, KNH
The Principal, College of Health Sciences, UoN
The Director, School of Public Health, UoN
AD/Health Information, KNH
Supervisors: Prof. Violet Kimani, Rose Opiyo