PATTERNS OF PRESENTATION AND MORTALITY TRENDS AMONG PEDIATRICS PATIENTS ADMITTED WITH BURNS AT KENYATTA NATIONAL HOSPITAL.

BY

DANIEL K. KORIR

W/62/75186/2014

A RESEARCH PROJECT SUBMITTED FOR PARTIAL FULFILMENT OF THE AWARD OF MASTERS OF SCIENCE DEGREE IN MEDICAL STATISTICS OF THE UNIVERSITY OF NAIROBI

2017
DECLARATION

This research project is my original work and has not been presented for a degree in any other University or any other award.

Signature ............................
Date...................................

Daniel Kipkurui Korir
W/62/75186/2014

SUPERVISORS APPROVAL

This research project has been submitted to the university with our permission as the university supervisors.

1. Mrs. Ann Wangombe

   Signature ............................
   Date...................................
   Lecturer, UNITID
   Department of Medical Statistics, University of Nairobi

2. Dr. David Gathara

   Signature ............................
   Date...................................
   Lecture, UNITID
   Department of Medical Statistics, University of Nairobi
DEDICATION

I dedicate this project to my loving family, my wife Philis, my son Larry and my two daughters Lauryn and Lainey, and all the paediatric patients admitted with burns at Kenyatta National Hospital.
ACKNOWLEDGEMENT.

I thank the Almighty God for the gift of life and good health during this entire period of my study at the University of Nairobi. Special thanks goes to my supervisors Mrs. Ann Wangombe and Dr. David Gathara for their professional and academic advice during my research project.

I am grateful to Kenyatta National Hospital management especially the Plastic surgery and Records & information departments for allowing me to carry out this project.
4.0 Introduction ........................................................................................................................................ 23
4.1 Demographic Data............................................................................................................................. 23
  4.1.1 Age Distribution of the Children ............................................................................................... 23
  4.1.2 Gender of the Children ............................................................................................................ 23
4.2 Patterns of presentation .................................................................................................................... 24
  4.2.1 Time of presentation following burns incidence ................................................................. 24
  4.2.2 Total Body Surface Area Involved In Burns ........................................................................ 25
  4.2.3 Parts of the body involved ...................................................................................................... 25
  4.2.4 Presence of inhalational burns .............................................................................................. 26
  4.2.5 Presence of Complications .................................................................................................... 26
  4.2.6 Length of stay in the hospital ................................................................................................. 27
4.3. Seasonality of the burns ................................................................................................................ 28
  4.3.1 The Time of the Year When the Burns Occurred .................................................................. 28
  4.3.2 Mortality trends....................................................................................................................... 29
  4.3.3 Time of the day the burn incidence occurred ........................................................................ 29
4.4 Causes of Burns ............................................................................................................................... 30
  4.4.1 The main cause of burns ...................................................................................................... 30
CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS ........................................... 31
5.0 Introduction ........................................................................................................................................ 31
5.1 Discussions ......................................................................................................................................... 31
  5.1.1 The demographic characteristics of the study participants ................................................. 31
  5.1.2 Patterns of presentation ......................................................................................................... 32
OPERATIONAL DEFINATIONS

**Burns:** A burn is a type of injury to flesh or skin caused by heat, electricity, chemicals, friction, sun or radiations on children

**Demographic characteristics:** Statistical data relating to the children with burns at Kenyatta National Hospital

**Living conditions:** The surroundings of the children admitted with burns.

**Mortality trends:** Refers to common risk factors predictive of mortality of children with burns.

**Patterns of presentation:** Refers to the condition in which the patients’ presents on admission including and not limited to total body surface area affected.
**LIST OF ABBREVIATIONS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERC</td>
<td>Ethics and Research committee</td>
</tr>
<tr>
<td>KDHS</td>
<td>Kenya Demographic and Health Survey</td>
</tr>
<tr>
<td>KNH</td>
<td>Kenyatta National Hospital</td>
</tr>
<tr>
<td>TBSA</td>
<td>Total Body Surface Area</td>
</tr>
<tr>
<td>UNITID</td>
<td>University of Nairobi Institute of Tropical and Infectious Disease</td>
</tr>
<tr>
<td>UoN</td>
<td>University Of Nairobi</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
ABSTRACT

Background: Burn injuries occurring among the children are most devastating and are a major global public health crisis. Without proper knowledge on patterns of presentation and mortality trends, such injury may cause untold suffering with increased mortality.

Objectives: To determine patterns of presentation and mortality trends of burns among paediatric patients admitted with burns at Kenyatta National Hospital.

Materials and methods: A retrospective study design was used. Authority was granted by KNH/UoN Ethics and Research Committee. A researcher Checklist was used to collect secondary data from all the files of mortality cases of children below 12 years admitted with burns from 1st June 2014 to 31st May 2017 from the hospital main registry. Data analysis was conducted using SPSS version 23.0. Statistical analyses were done using the chi square. Pearson correlation coefficient was done, P < 0.05 was considered significant.

Results: A total of 164 mortality files were reviewed. Findings were that males were 65.2% (n=107), while females were 34.8% (n=57) with a mean age of 2.9 years and a standard deviation of 2.83. The mean total body surface area (TBSA) involved was 37.6% with the highest being 90%. About 72% (n=118) reported more than 5 hours after the incidence, with 81.1% (n=133) presenting with multiple body parts involvement; one third had inhalation injuries, sepsis, and or shock. Main cause of the burns was scalds 48.2% (n=79%) and flames 44.5 % (n=73).

Conclusions and recommendations: The conclusions were that Mortality cases were high among male children with mean age of 2.99 years, presenting with an average of 37% TBSA involved, presence of inhalational injury, multiple body parts involvement, and sepsis or shock. Scalds and hot flames were the main cause of burns. The median length of stay was 2 days. The
study recommended that children presenting with TBSA burn involvement of more than 37%, has inhalational injuries, with complications such as shock, or sepsis should be closely monitored as they are likely to succumb. There is also a need to create awareness to the population at large.
CHAPTER ONE: INTRODUCTION

1.1 Background

Globally, burn injuries are a major cause for hospitalization and are associated with significant morbidity and mortality, adults and children alike (Albertyn, Bickler, & Rode, 2006). More than half of the world’s burn population reported resides in Asia owing to Asia’s larger population (Parbhoo et al, 2010). According to WHO (2010), Globally, nearly 96 000 children under the age of 20 years were estimated to have been fatally injured as a result of burns in 2009, with a death rate extremely high in low and middle income countries.

According to Dissanaike and Rahimi, (2009), in Australia, indigenous children had higher hospitalization rates for burns and scalds than non-indigenous children. Scalds account for about 60% of all paediatric burns in Australia. Two Australian studies found that, despite parental supervision, young children, with a median age of 12 and 17 months respectively, sustained burn injuries in the home when using a wood stove or hot iron (Kidsafe Western Australia, 2007)

Within the United Kingdom, tea was the commonest cause of burns, while hot water and coffee was the principle cause of burns in Denmark. In Mexico, common cooking ingredients (soups, grease, coffee, beans and menudo) were associated with a high incidence of burns. While in the United States of America, noodle soups and the ease with which instant soup containers could be tipped over was associated with unintentional scalds in children below the age of five years (Peck, 2007).

In developing countries, pediatric burns are more prevalent and are associated with a high mortality rate (Torabian & Sadegh, 2009). According to Cox and Rode (2010) Africa has the highest incidence of hospitalized paediatric burns while the America was the lowest. Annually,
in excess of 1300 children are reported to die from burns in South Africa, while over a 20-year period at a major American paediatric burns centre 145 children died (Cox & Rode, 2011). In a study done by Albertyn (2010) in South Africa, annually, approximately 3.2% of the South African population received burns with 50% occurring below the age of 20 years. Throughout Africa the incidence of burns has increased due to poverty; illiteracy; urban migration; overcrowding; and the establishment of slum areas and shanty towns that have minimal safety measures and are generally unfit for human habitation (Dissanaike & Rahimi, 2009)

In Kenya, sustained high incidence of burns among Kenyan children is very common in densely populated urban slums (KDHS, 2014). In a study done by Wong et al, (2013) in Kibera slums in Nairobi among 28,500 enrolled individuals (6000 households), 3072 incidences of burns were identified among the children. The overall incidence was 27.9/1000 person-years-of-observation. The incidences of burns was 3.8 fold greater in <5 compared to ≥5. Females ≥5 years old sustained burns at a rate that was 1.35-fold greater than males within the same age distribution. Hospitalizations were uncommon (0.65% of all burns). Children are highly susceptible to injury due to curiosity and the drive to experiment and discover. However, their drive is not matched by the capacity to understand and respond to danger. Therefore, regular supervision is necessary and this can be a challenge in poor families. For instance, many children in Kenya are left to be cared for by older siblings when their parents have other responsibilities. Even where parents are present, financial problems, poor living conditions and health problems have been found to decrease child supervision and hence increase tendency to burn injury. Also poor environment such as living in one bedroom where cooking takes place in the same room increases the risk for injuries such as burns (Schwebel,, & Bresausek, 2007).
1.2 Problem Statement

Burn injuries are among the most devastating of all injuries and a major global public health crisis especially among the children (Pek et al., 2008). Burns are the fourth most common type of trauma worldwide, following traffic accidents, falls, and interpersonal violence (WHO, 2010). Approximately 90 percent of burns occur in low to middle income countries, regions that generally lack the necessary infrastructure to reduce the incidence and severity of burns (Peck & Pressman, 2013).

Kenyatta National Hospital has witnessed a steady increase of the number of children aged below 12 years being admitted with acute burns over the years. According to Burns Unit/ward Admission Register (2016/17), the unit admitted an average of 32 children per month between July and December in the year 2016. This was an increase of 33.6% compared to the average number of admissions during the same period in the year 2015 which was 22 children aged below 12 years. In the year 2016, the number of pre-school children admissions with acute burns has also continued to rise, with an average of 38%. Over 40% of these children were admitted with about 60% burns whose prognosis had been very poor as most of them succumbed to their injuries.

Knowledge of the patterns of presentation of these patients may guide in their management and prevent complications and high mortality but has not been well established. As a result, many mortality cases continues to be witnessed among the children admitted with burns. It was for this reason that the researcher intends to conduct a study to establish the patterns of presentations and mortality trends of the paediatric burns patients.
1.3 Justification

Burns are a global public health problem, accounting for an estimated 265 000 deaths annually, majority of which occur in low and middle income countries, Kenya included (Peck & Pressman, 2013). In many high-income countries, burn death rates have been decreasing, and the rate of deaths from burns is currently over 7 times higher in low- and middle-income countries than in high-income countries (WHO, 2015). In Kenya, it has assumed alarming levels with a recurrent spate of stove explosions and electric burns resulting to high morbidity and mortality of the patients.

The steady increase in the number of children aged below 12 years in Kenyatta National Hospital with burns is alarming and requires to be addressed immediately. Such burns cause devastating effects to the children and their family at large resulting in permanent disabilities if proper care is not rendered on time. However, no studies have been published on the patterns and mortality trends of such patients’ which may give insights on management.

This study was therefore to determine the patterns of presentation and mortality trends of these patients. This would provide evidence based information as regards predictive presentation that are determinants to high incidences of mortality and hence give insights on management so as to minimize suffering and reduce mortality of the patients.
1.4 Research Questions

1. What are the patterns of presentation of paediatric burns patients admitted at Kenyatta National Hospital?
2. What are the mortality trends of paediatric burns patients at Kenyatta National Hospital?
3. What is the seasonality of burns injury among paediatric burns patients admitted at Kenyatta National Hospital?
4. What is the length of stay of paediatric burns patients prior to mortality at Kenyatta National Hospital?
5. What is the major cause of burns in paediatric patients admitted at Kenyatta National Hospital?

1.5 Study objectives

1.5.1 Main objectives

To determine patterns of presentation and mortality trends among paediatric burns patients admitted at Kenyatta National Hospital

1.5.2 Specific Objectives

1. To determine patterns of presentation of paediatric burns patients admitted at Kenyatta National Hospital
2. To determine the mortality trends of paediatric burns patients at Kenyatta National Hospital
3. To determine the seasonality of burns injury among paediatrics patients admitted with burns
4. To determine the length of stay of paediatric burns patients prior to mortality at Kenyatta National Hospital?

5. To establish the major causes of burns in paediatric patients admitted at Kenyatta National Hospital.

1.6 Significance of study

By investigating the patterns of presentation and mortality trends of burns in paediatric patients, this research would broaden the knowledge and understanding of burns in children and hence, this study would give evidence based ways of addressing burns appropriately for favourable outcome.

The study would be beneficial to the hospital administrators in developing training modalities of health care workers on what is expected in managing paediatric burns patients so as to reduce morbidity and mortality, this can be disseminated in low health facilities across the country.

To the policy makers, this study would help in developing or reviewing policies regarding burns management as based on the patterns of presentation and mortality trends which would be geared towards ensuring that suffering and mortality is reduced among the patients.

To the scholars and academicians, this study would act as a reference point to those who would be interested in conducting further studies on burns in paediatric patients.

1.7 Scope

The scope of the study encompassed all the children admitted in burns unit and burns wards Kenyatta National Hospital.
1.8 Basic Assumptions of the Study

The assumption of this study was that all the information regarding burns in children would be readily available in the hospital during the study period.
CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

In this chapter, the researcher reviews literature that has been published across the globe on patterns and presentation of burns in paediatric patients. The researcher intends to identify gaps that will be filled by this study. The review will be organized based on specific objectives of the study.

2.1 Burns in children

A burn is a type of injury to flesh or skin caused by heat, electricity, chemicals, friction, sun or radiations and thermal burns are the most common type (Hernden, 2008). According to WHO (2014), Skin injuries due to ultraviolet radiation, radioactivity, electricity or chemicals, as well as respiratory damage resulting from smoke inhalation, are also considered to be burns. Thermal burns occur when hot metals, scalding liquids, steam, or flames come in contact with your skin. These are frequently the result of fires, automobile accidents, playing with matches, improperly stored gasoline, space heaters, and electrical malfunctions. Other causes include unsafe handling of firecrackers and kitchen accidents (such as a child climbing on top of a stove or grabbing a hot iron) (Troubly, 2003)

According to WHO, burns are classified into First, second, third degrees depending on the extent of tissue damage.

2.2 Prevalence of Burns in children

Globally, burns among the children are a serious public health problem. An estimated 195 000 deaths occur each year from fires alone, with more deaths from scalds, electrical burns,
and other forms of burns, for which global data are not available (WHO, 2013). Fire-related deaths alone rank among the 15 leading causes of death among children and young adults 5-29 years. Over 95% of fatal fire-related burns occur in low- and middle-income countries. South-East Asia alone accounts for just over one-half of the total number of fire-related deaths worldwide and females in this region have the highest fire-related burn mortality rates globally (Robert et al, 2005). Among the various age groups, children under 5 years and the elderly (i.e. those aged over 70 years) have the highest fire-related burn mortality rates. In addition to those who die, millions more are left with lifelong disabilities and disfigurements, often with resulting stigma and rejection.

In sub-Saharan Africa it is estimated that over half a million children are hospitalized with burn injuries per year, with the majority occurring in low to middle income countries (Burd & Yuen, 2005). The majority of burns to young children occur as accidents in the home environment (Van Niekerk et al. 2004). Most regions however report scalds as causing the majority of burns to young children (Tarim et al. 2005). Males aged from 2.5 to 18 years are more likely to hospitalized with a burn injury that has resulted from their own behaviors, possibly due to increased exposure to activities that produce injuries and a pattern of more risk taking and rougher play than females (Piazza-Waggoner et al. 2005)

2.3 Demographics of Children Prone To Burns

In Kenya, sustained high incidence of burns among Kenyan children is very common in densely populated urban slums (KDHS, 2014). In a study done by Wong et al, (2013) in a Nairobi Kibera slums in approximately 28,500 enrolled individuals (6000 households), they identified 3072 incidences of burns among the children. The overall prevalence was 27.9/1000 person-years-of-
observation. Children <5 years old sustained burns at 3.8-fold greater rate compared to those ≥5 years old. Females ≥5 years old sustained burns at a rate that was 1.35-fold greater than males within the same age distribution. Hospitalizations were uncommon (0.65% of all burns).

Burns in very young children often occur from a mixture of curiosity and awkwardness. In children under the age of four years, the level of motor development does not match the child’s cognitive and intellectual development and injuries can thus occur more easily (Chung et al, 2006). According to a study done by Vassila and Elenei (2004) on fireworks-related childhood injuries in Greece, Infants under the age of one year are in a particular category, as their mobility starts to develop and they reach out to touch objects. Consequently, burns to the palms of the hands are particularly common, as a result of touching heaters or hot-water pipes and because a child has thinner skin on the palms and slower withdrawal reflexes, such contact burns may be deep and thus require prolonged and careful therapy during the healing phase to prevent flexure contractures of the hand (Argirova, 2005).

2.4 Mortality trends of burns

In a study on clinical outcome of patients with severe burns presenting to the emergency department in Turkey, the data for 1003 patients who presented with symptoms of severe burn to a tertiary care university hospital in Turkey between 2006 and 2007 were evaluated retrospectively. Results showed that the overall patient mortality was approximately eight percent of all the patient attended to. The study further revealed that mortality was high among patients with over 21% burns.
Ringo and Chilonga (2014) established that majority of patients less than five years old with second degree burns were likely to succumb to their injuries compared to older children with the same degree of burns. However, there was high number of cases of patients developing sepsis on which contributed to their prolonged hospital stay.

In another study by Wolf et al., (2007) conducted to assess predictors of mortality among patients admitted with burns, the study found that mortality in burns were determined by the age, the extent of burns (percentage of the body involved), and the inhalation injuries. The study revealed that burns over 80% of the body surface area that are mostly full-thickness often were considered fatal, especially in children and in the elderly. Shah et al (2011) found that The mortality rate was high in lower age group, larger burn size, presence of inhalation injury, delayed intravenous access, lower admission haematocrit, lower base deficit on admission, higher serum osmolality at arrival to hospital, sepsis, inotropic support requirement, platelet count < 20,000, and ventilator dependency during the hospital stay. Similarly, a study by Agbenorku et al, (2013) found that mortality risks common in paediatric patients with burns were lower age group below 3 years, scalds especially in children, total percentage burns greater than 36%, and inhalational injury.

2.5 The Predisposing Environmental Factors

According to a study done by Delgado et al., (2002) burns most commonly occurred in the patient's home and in a room used for cooking in more than half of the cases. Less often the site was a relative's or neighbour's house, or outside the house especially when children were left unattended. In the study it was also found that burns among children picked mostly in summer.
seasons and during school vacations and most of the burns took place when the parents were not around.

According to a study carried in Lima, it is clear that children of lower socioeconomic status have a greater risk for burns. The factor most strongly related to an increased risk was the lack of running water. There is one reason for this: shanty town houses in Lima without running water represent the poorest of the poor. Also in Lima shanty towns water heaters are not affordable, and water needs to be heated for cooking and bathing. This large heated water requirement leads to the boiling of liquids in pots that are often placed on the ground to cool or conserve space which predisposes most children to burns. Tea kettles, although much safer as a means of heating water, are more expensive, have a smaller capacity, and are not used as frequently as pots (Delgado et al., 2002)

Many studies have shown that the kitchen is the site of the majority of scalds and burns. In areas where, houses may not contain a separate room for use as a kitchen records high prevalence of burns compared to areas with a sitting rooms and a kitchen. Kitchens presumably increase the risk of burns because of the proximity to hot objects such as fire, oil, or boiling water. With the presence of a living room in the house, the risk of burns decreased (Rossi et al., 2008).

In another study carried by Ismail et al (2005) on childhood burns in Tanzania, found that after the age of 4, girls were more prone to scalds than boys, which may be due to girls working in the kitchen. Before the age of 4, however, boys were more likely to be burned than girls. This gender difference in the first years of life has been observed in other injuries in children. The study further found that most of the accidents occurred during school holidays due the fact that sometimes the children were left alone unattended to or when the mother was busy with other
household chores. In a study done by Walton and Mandera, (2006) on risk factors to burns in children found that, local customs of using open fires for cooking and heating, together with the wearing of loose-fitting clothing, particularly among teenage girls in the South-East Asia and Eastern Mediterranean regions were associated with an increased rate of burns among young children. The overwhelming majority of childhood burns occur in the home, and in particular in the kitchen. It has been suggested that the location within the home of the heating equipment and the structure of the kitchen may present significant risks to children (Witsaman et al, 2006).

According to a study on socioeconomic status and childhood burns injury in South Africa by Witsaman et al (2006), many homes consist of one or two main rooms, that are divided by temporary internal divisions made of curtains or cardboard. These rooms are utilized for functions such as sleeping, washing, cooking and eating, depending on the time of day and the requirements of the family, or else as a work space. This type of domestic arrangement may greatly increase the exposure of a child to domestic equipment and sources of heat.

A number of case-control and descriptive studies conducted in different parts of the world have identified several socioeconomic factors that increase the risk of childhood burns (Paulos et al, 2006). These factors include: a low rate of literacy within the family; living in overcrowded dwellings or with cluttered areas in the home; a failure of proper supervision of children; a history of burns among siblings; the absence of laws and regulations relating to building codes, smoke detectors and flammable clothing.

Mothers or caregivers knowledge on causes of household burns and its prevention is very vital in reducing the incidences of burns and unnecessary sufferings among children due to burns (Edelman, 2007). In a study done by Khandarman, Harun Rashid and Sakamoto (2012) on risk
factors to burns among children in Mongolia, the study found that the caregivers’ knowledge and practices on childhood burns were generally insufficient and therefore was a major contributing factor to burns among the children. Therefore, specific intervention like caregivers’ education program and encouraging the mothers /caregivers to ensure safe domestic environment should be undertaken to increase their awareness on burn related issues to reduce childhood burns. In another study on risk factors for burns in children, found that poor maternal education and limited knowledge on burns is a major contributing factors as mothers are not aware of the risk factors within the house which may easily cause burns in young children (Delgado et al., 2002). Studies have shown that illiterate mothers do not take precaution from household chemicals in urban slum because these chemicals are put within reach of these children, which can easily cause burns (Sharma, 2005). In another study, it was also observed that the under five years old children whose mothers were either illiterate or educated up to primary standard, were more at risk of different type of home accidents including burns as compared to educated mother in urban slum (Monda et al., 2005). According to a study done in Tanzania, on causes, magnitude and management of burns in under-fives in district hospitals by Justine Temu et al (2008), mothers knowledge on causes of burns were inadequate, and most of the times, toddlers were left wondering about in the house unattended to. Similarly, the chemicals, hot water and other hot objects were kept within reach in most households which were therefore a major contributing factor to burns among the children. In a similar study done in Tanzania on childhood burn injuries in children in Daresalam: Patterns and perceptions of prevention, over 72.2% of the mothers interviewed had knowledge on how to prevent burns in children but the attitudes and practices were very poor hence ended up exposing their children to burn injury. Therefore, the
study concluded more awareness on burns should be carried out and mothers’ practices and attitudes towards good preventive practices should be encouraged (Mbembati et al., 2013)

2.6 Seasonality of Burns in children

Burn injury in children has definite patterns and occurs during specific seasons. According to Chen et al., (2007) when all causes of burn and scald injuries in children are included, winter has the second fewest number of burns injury presentations in children of all seasons. However, when the cases of sunburn are omitted, winter becomes the season with the highest number and greatest proportion of burns and scalds injury presentations.

Krishnamoorthy et al., (2012) in a study on burn injuries in paediatrics found that regardless of the greater proportion of injury presentations for burns & scalds during the winter months, burns and scalds fits well with the increasing consumption of hot drinks and use of heating devices during the winter months. Winter is the time when people start to look for ways to keep warm to combat the dropping temperatures and coming rains. Heaters, hot water bottles and electric blankets are pulled out of storage and steaming hot baths, soups, drinks and porridge become more frequent. All of these help to keep us warm - but they also put us at risk of burns and scalds. Weson et al, (2013) in a study in South Africa on paediatric burns, found that high incidences of burns in children were very common during school holidays when most of the children are at home and are care of their parents and were mostly due to parental neglect. In the same study, it was found that burns were mostly due to hot liquids which were placed within reach of the children. Van Niekerrkyg et al, (2013) in another study in incidences and patterns of childhood burns found that burns in children mostly occur during cold weather, and mostly in
toddlers and infants, and in African child, most burns are particularly high in winter when the weather is very cold and everyone is trying to keep warm.
CHAPTER THREE: METHODOLOGY

3.1 Introduction.

This chapter presents the study design, study area and the sampling technique that was used. It also describes how data was collected, analysed and presented.

The principal investigator retrieved and obtained the variables of clinical histories from the admission records, case notes, operation details, anaesthesia charts, and nursing monitoring charts.

3.2 Study design

This was a retrospective study of all mortalities of patients admitted with burns in both burns unit and Burns ward 4D between June 1st, 2014 and June 31st, 2017. Data was collected from the hospital’s patient database records over a 36-month period (1st June 2014 through 31st May 2017).

3.3 Study Area

The study was conducted in burns units and Burns ward 4D at Kenyatta National Hospital. Burns unit is located on the first floor of the hospital’s main tower block directly opposite critical care unit. The unit admits burns patients who are critically ill with children having 20% burns and above, and adults with over 30% burn injuries. Specialized management is offered to these critically ill burns patients in this unit, after they are stabilized they can be discharged to Ward 4D or home depending on the treatment outcome. Ward 4D is located on the fourth floor of the hospital’s main tower block. It admits burns patients both children and adults with lower percentage of burns either directly from accident and emergency department, or from the burns unit.
3.4 Target population.

All mortalities from burns paediatric patients aged below 12 years admitted at KNH burns unit and Ward 4D, from 1st June 2014 to 31st May 2017.

3.5 Inclusion Exclusion Criteria

3.5.1 Inclusion Criteria:

All mortality cases due to burns among children aged between 1 day and 12 years from 1st June 2014 to 31st May 2017 at Kenyatta National Hospital.

3.5.2 Exclusion Criteria

The following were excluded from the study:

Mortality cases of children admitted with burns above 12 years.

3.6 Sampling technique and sample size.

3.6.1 Sampling technique.

Non sampling method-census to be used, since all the mortalities formed the study population

3.6.2 Sample size Determination

Since the study was to know the true trends, then all mortalities from burns injuries which occurred in that period were considered for study All mortality cases between 1st June 2014 to 31st May 2017 amounting to 164 cases.
3.7 Retrieval/recruitment procedure

Using the health registry statistics unit, all inpatient numbers of pediatric burns mortalities from 1st June 2014 to 31st May 2017 were identified and files retrieved from the deceased files section. They were then kept on the study lockers where manual perusal of all medical records was done. In total out of 187 files identified only 164 were retrieved (89%).

3.8 Data collection instruments.

A checklist was used to collect secondary data from the patient’s medical records. The checklist had the following sections: Bio data of the patient, the patterns of presentation, seasonality of the burns, and length of stay and mortality trends. Data extracted included demographics as well as treatment methods. The variables were recorded and analyzed.

3.9 Pre-Testing of the Study Tool

Pre-testing of the data collection instrument was done for mortality cases between January 2016 and March 2016. This was to test the reliability and the validity of the study tool. Pretesting helped the researcher to make any necessary changes on the study tool to ensure that data collected was of quality and addresses the study objectives.

3.10 Validity of the Instrument

Validity is the degree to which results obtained from the analysis of the data actually represents the phenomenon under study (Mugenda Mugenda, 2003). Content validity of the questionnaire will be tested by giving it to the supervisor who will identify items that maybe inadequate and suggest the necessary corrections. For face validity, the questionnaires were piloted on 10%
of the potential cases which were randomly picked. Insights obtained from the pilot survey will be analyzed and used to make adjustments in the study instrument.

3.11 Reliability of the Instrument

Mugenda Mugenda (2003) defines reliability as a measure of the degree to which a research instrument yields consistent results or data after repeated trial. Raw data from the instrument was subjected to a reliability analysis from which Cronbach’s co-efficient alpha was systematically and consistently computed. To this end, a 0.7 Cronbach alpha coefficient level of reliability was deemed reliable.

3.12 Data analysis

The data collected was thoroughly cleaned and entered into MS-Excel spread sheets and analysis carried out. Data analysis was conducted using SPSS version 23.0. Data was summarized in frequencies and percentages for categorical variables and as means and ranges (for continuous variables). Dichotomous variables was analysed using the Chi-square test (with Yates correction).
<table>
<thead>
<tr>
<th>Research Objective</th>
<th>Variable and Indicators</th>
<th>Research Design and Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>To determine patterns of presentation of paediatric burns patients admitted at</td>
<td>Patterns of presentation and incidences of burns</td>
<td>Descriptive</td>
</tr>
<tr>
<td>Kenyatta National Hospital</td>
<td>• Body parts Involvement</td>
<td></td>
</tr>
<tr>
<td>To determine the mortality trends of paediatric burns patients at Kenyatta National</td>
<td>Mortality trends and incidences of burns</td>
<td>Descriptive</td>
</tr>
<tr>
<td>Hospital</td>
<td>• Mortality cases in relation to percentage body coverage and presentations</td>
<td></td>
</tr>
<tr>
<td>To determine the seasonality of burns injury among pediatrics patients admitted</td>
<td>Seasonality and incidences of burns</td>
<td>Descriptive</td>
</tr>
<tr>
<td>with burns</td>
<td>• Seasonality in terms of month, time of day relation to incidences of burns</td>
<td></td>
</tr>
<tr>
<td>To determine the length of stay of pediatric burns patients prior to mortality at</td>
<td>Length of Stay status and burn involvement</td>
<td>Descriptive</td>
</tr>
<tr>
<td>Kenyatta National Hospital?</td>
<td>• Length of stay in relation to mortality and body area affected</td>
<td></td>
</tr>
<tr>
<td>To establish the major causes of burns in pediatric patients admitted at Kenyatta</td>
<td>Cause and incidences of burns</td>
<td>Descriptive</td>
</tr>
<tr>
<td>National Hospital.</td>
<td>• Risk factors to burns in relations to frequency of incidences of burns</td>
<td></td>
</tr>
</tbody>
</table>
3.14 Ethical Consideration.

Permission to study was sought from University of Nairobi /KNH research and ethics committee. Confidentiality was fully adhered to. All the retrieved files were kept under lock and key and was only accessed by the researcher or the research assistants for the purposes of Data Collection. No information regarding the patients details was captured anywhere in the form. The study was anonymous. All the data collected was also under lock and key, and for soft copies were password protected.
CHAPTER FOUR: FINDINGS AND RESULTS

4.0 Introduction

This chapter presents the results of the study analyzed and presented as per the questionnaire. A total of n=164 burns mortality files for 3 years i.e. from 2014-2017 at Kenyatta National Hospital were retrieved and data obtained. All the data collected was analyzed using SPSS version 23.0. The findings were presented as shown below.

4.1 Demographic Data

4.1.1 Age Distribution of the Children

The mean age of the children was 2.99 years. The maximum age was 12 years with a minimum age of 0.1 years, the median age was 2yrs.

<table>
<thead>
<tr>
<th>Age in years</th>
<th>N</th>
<th>IQR</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
<td>164</td>
<td>1-4</td>
<td>2.00</td>
</tr>
</tbody>
</table>

4.1.2 Gender of the Children

As shown in Table 2 and figure 1 below, Majority 65.2%, (n=107) were male children while females were 34.8%, (n=57) of the total respondents
### Frequency and Percent

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>107</td>
<td>65.2</td>
</tr>
<tr>
<td>Female</td>
<td>57</td>
<td>34.8</td>
</tr>
<tr>
<td>Total</td>
<td>164</td>
<td>100.0</td>
</tr>
</tbody>
</table>

#### 4.2 Patterns of presentation

#### 4.2.1 Time of presentation following burns incidence

Table 3: shows that majority 48.2%, \(n=79\) of the children presented themselves at the hospital over 8 hours after burns incidence, followed by 25.0% \(n=41\) of them who presented 2-4 hours after the incidence.

<table>
<thead>
<tr>
<th>Time</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 hr</td>
<td>5</td>
<td>3.0</td>
</tr>
<tr>
<td>2-4 hrs</td>
<td>41</td>
<td>25.0</td>
</tr>
<tr>
<td>5-8hrs</td>
<td>39</td>
<td>23.8</td>
</tr>
<tr>
<td>Over 8 hrs</td>
<td>79</td>
<td>48.2</td>
</tr>
<tr>
<td>Total</td>
<td>164</td>
<td>100.0</td>
</tr>
</tbody>
</table>
4.2.2 Total Body Surface Area Involved In Burns

The mean Total body surface area (TBSA) involved was 37.61%, the minimum TBSA was 5.0% and the Maximum being 90.0%, and a median of 35%.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>Median</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBSA</td>
<td>164</td>
<td>5.0</td>
<td>90.0</td>
<td>35.00</td>
<td>37.616</td>
</tr>
</tbody>
</table>

4.2.3 Parts of the body involved

As shown in table 5, Majority 81.1% (n=133) were having multiple parts of the body involved. The buttocks and the genitalia was the list involved.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head and Neck</td>
<td>16</td>
<td>9.8</td>
</tr>
<tr>
<td>Trunk</td>
<td>11</td>
<td>6.7</td>
</tr>
<tr>
<td>Upper limb</td>
<td>3</td>
<td>1.8</td>
</tr>
<tr>
<td>Buttocks and Genitalia</td>
<td>1</td>
<td>.6</td>
</tr>
<tr>
<td>Multiple parts</td>
<td>133</td>
<td>81.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>164</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
4.2.4 Presences of inhalational burns

Majority 65.2% (n=107) had inhalational burns, while 34.8% (n=57) had no inhalational burns as shown in figure 4 below.

![Pie chart showing presence of inhalational burns](image)

Figure 1: Presence of inhalational burns (n=164)

4.2.5 Presence of Complications

As shown in figure 6, majority 47.0% (n=77) had shock as a complication, followed by 20.7%, (n=34) who had sepsis, however, 32.3% (n=53) had no complications at all.
4.2.6 Length of stay in the hospital

The mean length of stay was 8.69 days. The median length of stay was 2 days with an IQR of 1-5.7 days.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>IQR</th>
<th>Median</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of stay</td>
<td>164</td>
<td>1-5.7</td>
<td>2.0</td>
<td>8.69</td>
<td>28.12681</td>
</tr>
</tbody>
</table>

Figure 2: Presence of complications (n=164)
4.3. Seasonality of the burns

4.3.1 The Time of the Year When the Burns Occurred

As shown in figure 3 below, majority 39.0% (n=64) of the burns occurred between July – September, followed by 30.5% (n=50) which occurred between October and December. Burns incidences was least experienced between January and March as only 14.0% (n=23) were reported.

Figure 3: Seasonality of the burns (n=164)
4.3.2. Mortality trends.

As shown in figure 4 below, there was a steep rise of mortalities between June and September for the year 2014 and 2016 as compared to same season in 2015.

Figure 4

4.3.3 Time of the day the burn incidence occurred

Table 7 below shows that, 33.5% (n=55) of the cases of burns in children occurred in the evening, while the least cases were experienced during lunch hours 18.3% (n=30).

<table>
<thead>
<tr>
<th>Time of the Day</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning hours</td>
<td>43</td>
<td>26.2</td>
</tr>
<tr>
<td>Lunch hours</td>
<td>30</td>
<td>18.3</td>
</tr>
<tr>
<td>Evening hours</td>
<td>55</td>
<td>33.5</td>
</tr>
<tr>
<td>Night hours</td>
<td>36</td>
<td>22.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>164</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
4.4 Causes of Burns

4.4.1 The main cause of burns

The main cause of burns was scalds 48.2%, (n=79), followed by flames 44.5% (n=73).

Electricity was found to be the least cause of burns in children as only 1.2% (n=2) were burned by electricity.

Figure 5: Causes of burns (n=164)
CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

In this chapter, the researcher discusses the study findings in relation to previously conducted and published studies for similarities or any significant differences.

5.1 Discussions

5.1.1 The demographic characteristics of the study participants.

The study was about children aged below 12 years who had died of burns admitted at Kenyatta National Hospital burns wards and burns unit. All the mortality cases between 31st May 2014 and 1st of June 2017 covering a span of 3 years were retrieved and data collected. The mean age of majority of the children was 2.99 years and almost two thirds of the mortality cases were males. This was indication that mortality trends of burns cases in children were high in children below 5 years and males were the most affected. This could be due to the fact that, children at below five years and males in that matters are toddlers and usually tend to be very aggressive explorers of their surrounding environment, and when left unattended are likely to suffer burns. The findings were in agreement with a study by Chung et al who established that majority of mortality cases in children was among children aged below 4 years due to the fact that there is usually a mismatch between the motor and cognitive development in these children. The study findings were also in agreement with a study by Vassila and Eleneni who established that mortality was very high among male children who are very aggressive compared to their female counterparts of the same age. Similarly, the study findings were also in agreement with a study by Ringo and Chilonga (2014) who established that majority of patients less than five years old with second
degree burns were likely to succumb to their injuries compared to older children with the same degree of burns.

5.1.2 Patterns of presentation

Approximately half of the mortality cases presented at the health facility more than 8 hours after the incidence showing delay in presentation. Further the mean total body surface area affected with burns was 37.6% with as high as 90% of the body affected. In addition, almost all the cases 81% had multiple body parts involvement. Two thirds had inhalational burns as well and similar proportion having complications which were mainly shock and sepsis.

The study therefore established that mortality cases of children with burns are associated with late presentation, high Total body surface area affected, presence of inhalation burns and multiple body parts involvement.

The findings were similar to a study by Wolf et al., (2007) who found that mortality rate was high among children admitted with burns, and was determined by determined by the age, the extent of burns (percentage of the body involved), and the inhalation injuries. The study revealed that burns over 80% of the body surface area that are mostly full-thickness often were considered fatal, especially in children and in the elderly. Similarly, the findings were in agreement with a study by Shah et al (2011) who found that the mortality rate was high in Lower age group, larger burn size, presence of inhalation injury, delayed intravenous access, lower admission hematocrit, lower base deficit on admission, higher serum osmolarity at arrival to hospital, sepsis, inotropic support requirement, platelet count < 20,000, and ventilator dependency during the hospital stay. Similarly, a study by Agbenorku et al, (2013) found that mortality risks common in paediatric
patients with burns were lower age group below 3 years, scalds especially in children, total percentage burns greater than 36%, and inhalational injury.

5.1.3 Average Length of Stay Prior to Death

The mean length of stay of prior to death was 8.69 days, however, the shortest length of stay was 1 days while the highest was 327 days with a standard deviation 28.126 days. This shows that there was a lot of variations in terms of length of stay prior to death, hence length of stay was an unlikely a determinant of mortality in burns as death may occur on day one of admission and can happen several days after the admission, however, most of the cases occurred 8 days after admission. The findings were in agreement with a study by Shah et al., (2011) who found that mortality rate was high in Lower age group and dependent on the extent of body surface area involvement but was not dependent on length of stay in the hospital. However, with immediate and proper care, most of the patients may stay for long duration of time and may eventually discharged home.

5.1.4 Seasonality of the Burns

The burns cases were found to be high, between July - September, and October – December unlike January to June. During these period, most of the children are out of school on holidays and such when playing unattended are likely to suffer burns. Such injuries were noted to be high during morning and evening hours. According to Chen et al., 2007 Burn injury in children has definite patterns and occurs during specific seasons. When all causes of burn and scald injuries in children are included, winter has the second fewest number of burns injury presentations in children of all seasons. However, when the cases of sunburn are omitted, winter becomes the season with the highest number and greatest proportion of burns and scalds injury presentations.
Similarly, according to a study by Krishnamoorthy et al., (2012) majority of children get burned during cold seasons when most people tend to be near fire and take hot drinks. The findings of the current study were in agreement with a study by Weson et al, (2013) in a who found that high incidences of burns in children were very common during school holidays when most of the children are at home and are care of their parents and were mostly due to parental neglect. In the same study, it was found that burns were mostly due to hot liquids which were placed within reach of the children.

5.1.5 Cause of burns

The main cause of burns in children were mainly scalds and flames as almost all the mortality cases was arising from burns caused by hot liquids and fire. Findings of which were similar to a study by Khandarman, Harun Rashid and Sakamoto (2012) who established that the main cause of burns in children was due to scalds (Hot liquids such as tea, water,) and flames which was mainly as a results of as a result of touching heaters or hot-water pipes and because a child has thinner skin on the palms and slower withdrawal reflexes, such contact burns may be deep and very devastating. Findings were also similar to those of s study by Walton and Mandera who found that majority of mortality cases due to burns in children were those caused by hot liquids and fire and were high among children of poor socio-economic and living in slum areas where there is overcrowding and poor lighting system.
5.2 Conclusions

Based on the results and discussion above, mortality cases were high among male children aged 5 years, with a median age of 2 years.

Mortality cases were also high among children with TBSA greater than 37%. In addition delayed admission at the health facility, multiple body parts involvement and presence of inhalation injury, sepsis and or shock were found to be highly associated with mortality among burns patients.

Median length of stay prior to mortality was 2 days and more than three quarters of burns occurred between July - September, and December, with scalds being the highest cause of burn.
5.3 Recommendations

There is immediate need to raise awareness of the population at risk on burn injuries among children by implementing educational program in schools, kindergartens, day care centers, community clinics and post natal clinics. This should include, close monitoring of children, prompt health care seeking immediately after the incidence.

Likewise, all burns injury in children aged below 5 years, with over 37% TBSA, and presence of inhalational injuries and complications such as sepsis and or shock should be promptly attended to and closely monitored.
# WORK PLAN IN GANTT CHART

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Proposal Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Proposal Presentation to the KNH/UON Ethics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and Research Committee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Pretesting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Data Collection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Data Analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Draft Report Writing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Recommendations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Dissemination of Findings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Final Report Writing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## STUDY BUDGET

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
<th>RATES – KSH</th>
<th>TOTAL- Ksh</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Collection of secondary data</td>
<td>5 days @ Ksh 5,000 per day</td>
<td>25,000</td>
</tr>
<tr>
<td>2.</td>
<td>KNH/UON ERC fee</td>
<td>@1000/=</td>
<td>1,000</td>
</tr>
<tr>
<td>3.</td>
<td>Training of 5 research assistants</td>
<td>2 days training @ Ksh 2,000 per person x 2 days x 5 persons</td>
<td>10,000</td>
</tr>
<tr>
<td>4.</td>
<td>Data entry clerks (2) for 5days</td>
<td>5 days @1,000 per person</td>
<td>10,000</td>
</tr>
<tr>
<td>5.</td>
<td>Photocopying questionnaires</td>
<td></td>
<td>10,000</td>
</tr>
<tr>
<td>6.</td>
<td>Printing papers</td>
<td>10 reams x ksh 400</td>
<td>4,000</td>
</tr>
<tr>
<td>7.</td>
<td>Printing and production of thesis</td>
<td>5 copies of thesis @ 1,000</td>
<td>10,000</td>
</tr>
<tr>
<td></td>
<td>TOTAL COST – KSH</td>
<td></td>
<td><strong>70,000</strong></td>
</tr>
</tbody>
</table>
REFERENCES


http://doi.org/10.1016/j.burns.2013.10.019


APPENDIX 1: QUESTIONNAIRES/CHECKLIST.

Topic: Patterns of presentation and mortality trends among paediatric patients admitted with burns at Kenyatta National Hospital.

Instruction

1. All the information to be retrieved from the patient’s medical records

2. No patient identification details should appear anywhere on the study tool

3. Ensure all the questions are answered

Part One: Demographic data

1. Age of the child..................

2. Gender:
   a) Male
   b) Female

Part Two: Patterns of presentation

3. Time of presentation at the facility after burns incidence
   a) Less than 1 hour
   b) 2-4 hours
   c) 5-8 hours
   d) Over 8 hours
4. Total body surface area involved in percentage..................................

5. Part of the body involved
   a) Head and neck
   b) Trunk
   c) Upper limb
   d) Buttocks and genitalia
   e) Multiple parts

6. Was there inhalation burns involved
   a) Yes
   b) No

7. Any Complications
   a) Shock
   b) Sepsis
   c) None

8. Length of hospital stays in days..............................................

Part Three: Seasonality

9. What time of the year did the burn occur?
10. What time of the day did the burn occur?
   a) Morning hours  
   b) Lunch hour  
   c) Evening hours  
   d) Night hours

**Part Four: Causes of Burns**

11. What was the cause(s) of burns?
   a) Scalds (Hot liquids)  
   b) Flames  
   c) Electricity  
   d) Chemicals
Dear Daniel,

REVISED RESEARCH PROPOSAL – PATTERNS OF PRESENTATION AND MORTALITY TRENDS AMONG PEDIATRICS PATIENTS ADMITTED WITH BURNS AT KENYATTA NATIONAL HOSPITAL (P573/10/2017)

This is to inform you that the KNH-UoN Ethics & Research Committee (KNH-UoN ERC) has reviewed and approved your above proposal. The approval period is from 15th November 2017 - 14th November 2018.

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) 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.
d) Death and life threatening problems and serious 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.
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) 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.

Protect to discover
For more details consult the KNH- UoN ERC website http://www.erc.uonbi.ac.ke

Yours sincerely,

PROF. M.L. CHINDIA
SECRETARY, KNH-UoN ERC

c.c. The Principal, College of Health Sciences, UoN
    The Director, CS, KNH
    The Assistant Director, Health Information, KNH
    The Chairperson, KNH-UoN ERC
    The Director, Institute of Tropical and Infectious Diseases (UNITID), UoN
    Supervisors: Mrs. Ann Wang'ombe (UNITID, UoN), Dr. David Gathara (UNITID, UoN)

Protect to discover
Ref: KNH/HOD/SP-SURG/7/VOL.1

Date: 20th November, 2017

Daniel Kipkurui
Institute of Tropical & Infectious Diseases (UNITID)
College of Health sciences
University of Nairobi.

Dear Daniel,

RE: APPROVAL TO COLLECT DATA

We acknowledge your request on the above, together with a study registration form and a KNH/UoN ERC approval on the study titled "Patterns of presentation and mortality trends among paediatrics patients admitted with burns at Kenyatta National Hospital."

Approval has been granted for you to collect data at Kenyatta National Hospital Burns Unit and Ward 4D to enable you complete your study.

Kindly liaise with the Senior Assistant Chief Nurse incharge of Specialized Surgery for facilitation. By a copy of this letter, the SACN Specialized Surgery is informed and requested to facilitate.

Kindly, note that we would like you to forward a copy of the study report to the department after completion of the study.

DR. JOEL LESSAN
HOD SPECIALIZED SURGERY

Copy to: SACN Specialized Surgery