A BURNED CHILD'S PAIN DURING TREATMENT AS ASSESSED BY THE CHILD, CAREGIVER AND THE NURSE

By

Joseph Alfred Lekule

A Dissertation Submitted in partial Fulfillment of the Requirements for the Degree of Master of Science in Nursing (Critical Care &Trauma) of Muhimbili University of Health and Allied Sciences

Muhimbili University of Health and Allied Sciences
October, 2013

CERTIFICATION

The undersigned certify that she has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled ***A Burned Child's Pain During Treatment as Assessed by The Child, Caregiver and The Nurse*** in (Partial) Fulfillment of the requirements for the degree of Master of Science in Nursing (Critical Care and Trauma) of Muhimbili University of Health and Allied Sciences.

_____

A. Outwater (*RN, PhD*)

(Supervisor)

Date: _____

DECLARATION
AND
COPYRIGHT

I, **Joseph A. Lekule,** declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature ……... Date ……...

This dissertation is a copyright material protected under the Berne Convention, the Copyright Act 1999 and other international and national enactments, in that behalf, on intellectual property. It may not be reproduced by any means, in full or in part, except for short extracts in fair dealing, for research or private study, critical scholarly review or discourse with an acknowledgement, without the written permission of the Directorate of Postgraduate studies, on behalf of both the author and the Muhimbili University of Health and Allied Health Sciences.

ACKNOWLEDGEMENT

Many thanks to the almighty God for by His grace this work has been possible. I would also like to extend my sincere gratitude to my employer (Permanent Secretary-Ministry of Health and Social Welfare) for granting permission from work to attend this course and for funding of my MSc. studies.

Particularly, I feel so much indebted to my supervisor, Dr. Anne Outwater from the School of Nursing at MUHAS for her continued technical guidance. Without her, this piece of work would have been unsuccessful.

Furthermore, I would also like to express my gratitude to the rest of the teaching and administrative staff of the School of Nursing for their teaching and guidance. The Dean, School of Nursing, Dr. Sebalda Leshabari, deserves special mention for her continual support and encouragement throughout the study period.

Lastly, I would like to thank all participants for voluntarily providing useful information in this research activity. The accomplishment of this study required the involvement of many individuals whom I may not mention all of them here, but I am really grateful to you all

DEDICATION

This dissertation is dedicated to my dear wife Glory, daughter Brenda and sons, Deogratius and Tadeus, who sacrificed so much to give me time and support for the successful completion of my studies. My dear parents, Mr. and Mrs. Shembilu, I thank you so much for laying a good foundation in my life and my education. It is for this foundation that I have grown into a person who I am today, doors opening up for higher academic circles.

ABSTRACT

Background: Burn injuries in children remain a significant public health concern in Tanzania, where research and interventions to decrease risk are lacking or inadequate. Pain is the most common symptom experienced in these children. The extent to which burn pain is undertreated in under-ten year old children with burn injuries is unknown in Tanzania.

Purpose: The purpose of this study was to assess pain management in children with burn injuries admitted at KCMC hospital

Methods: A descriptive cross-sectional study was conducted at KCMC hospital, in May and June, 2013. Information about the child was obtained from the caretakers by using semi-structured questionnaire. Also all 47 caretakers of recruited children were requested to rate the child's pain. Interview by using unstructured questionnaire was conducted in 23 nurses caring for children with burn injuries and they were also requested to rate the child's pain on a VAS scale. Pain was measured by using VAS for children 6 years and above, nurses and caretakers and FLACC for children below 6 years old. Data was analyzed using SPSS version 20 software.

Results: Most children were under 4 years old, where 20(42.54%) were aged 1-2 years 3-4 years 10(21.3%) and 0-1 years 6(12.76%) years and most of them 30(63.8%) were males. A vast majority 40(85.1%) were from rural areas. All burns in these children were non-intentional and occurred at home mostly 33(70.2%) in the kitchen. Scald was the most common cause of burns in 33(70.2%). Burns between 10% and 20% constituted 29(61.7%) TBSA and above 20% constituted 18(38.3) TBSA. Most burns 31(66.0) were deep burns and 14(29.8) were full thickness burns. The most common agent of burn in these children 33(70.2%) were hot fluid or food. All children in the study were taken to hospital within 24 hours after sustained burn injury. A vast majority had local agents applied on the wound as a first aid treatment provided by parents or caretakers at home.

Pain score in children ranged from 5 to 10 (mean = 8.83; SD 1.324). Most children 29(61.70%) were in worst pain during wound dressing. Severe pain was measured in 15(31.91%) of children and significant pain in 3(6.38%). More children with deep (mean = 9.00; SD = 1.00) and full thickness burns (mean = 9.00; SD = 2.00) experienced severe pain than those with superficial burn (mean = 7.00; SD = 1.00) during dressing changes. There was no significant difference between the mean pain score of children and caretaker (t=0.257; SD=1.599; df=92; p=0.8). The highly significant difference in pain score was observed between children and nurses (t=4.387; SD=1.799; df=92; p<0.0018). Result showed that there was no standard and common method used by nurses to assess child pain. Drugs administered orally and by injection were the main methods used to relief child's pain. Non-pharmacological methods are not commonly used by nurses to relieve pain in children with burn injuries.

Conclusion: Burn injuries could be prevented by encouraging child supervision, improving the home environment, and living conditions and through educating parents and caretakers. Better pain management can be achieved encouraging nurses to trying to understand the child's experience of pain and by providing appropriate pain relief drugs and non-pharmacological methods.

TABLE OF CONTENTS

Content	**Page**
Certification ……..……..	ii
Declaration and copyright…...…….	iii
Acknowledgements …….…….	iv
Abstract ……	vi
Table of contents ……..	viii
Operational definition of terms ……	x
Acronyms	xi

CHAPTER ONE

1.0 Introduction ……	1
1.1 Background information …….	1
1.2 Statement of the problem ……	4
1.3 Significance of the study …….	5
1.4 Research questions ……..	5
1.5 Objectives ……	6
1.6 Conceptual framework …….	6

CHAPTER TWO

2.1 Literature review …….	10

CHAPTER THREE

3.0 Methods ……..	22
3.1 Study design ……	22
3.2 Area of study……	23
3.3 Target population …….	24

3.4. Eligibility criteria …… 25
3.5 Sampling ……. 26
3.6 Sample size …….. 27
3.7 Data collection methods …….. 28
3.8 Pre-testing …… 32
3.9 Reliability and validity …… 33
3.10 Data processing and analysis ……. 34
3.11 Ethical Clearance …… 35

CHAPTER FOUR

4.0 Results …….. 37

CHAPTER FIVE

5.0 Discussion ……. 50

CHAPTER SIX

6.0 Conclusion and recommendations …… 67
6.1 Conclusion ……..…….. 67
6.2 Plan for utilization...……... 68
6.3 Recommendations ……. 68
References …… 72
Appendices ……..... 77

Operational definition of terms

Burn: Is an injury to the skin or other organic tissue in the child caused by heat or due to radiation, radioactivity, electricity, friction or contact with chemicals.

Burn injury: Refers to any damage inflicted to the body of a child due to any burning agent

Pain: Is an unpleasant sensory and emotional experience of the child associated with actual tissue damage due to burn

Acronyms

APS	American Pain Society
DDH	District Designated Hospital
FLACC	Face, Legs, Activity, Cry and Consolability
KCMC	Kilimanjaro Christian Medical Centre
MNH	Muhimbili National Hospital
MOHSW	Ministry of Health and Social Welfare
MSS	Mean Sample Score
MUHAS	Muhimbili University of Health and Allied Sciences
NSAIDs	Non-Steroid Anti-inflammatory Drugs
NSKC	National Safe Kids Campaign
PCA	Patient Controlled Analgesia
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences
TBSA	Total Body Surface Area
USA	United States of America
VAS	Visual Analogue Scale
WHO	World Health Organization

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the study

Burn injuries constitute a major public health problem in Tanzania and it has a significant contribution to childhood morbidity and mortality (Chalya et al., 2011). It affects all populations in the country, mostly children, but has received less attention as compared to other diseases. The fight against burn injuries is proceeding in high income countries although preventive measures are not adequate in low income countries like Tanzania. The major burden of burn injuries is inflicted upon people in the middle and low income countries and minority populations in high income countries (Roman, Lewis, Kingwangala & Wilson, 2012). Preventive measures require national and international attention.

One of the most common symptoms in burned children is pain. According to the International Association for the Study of Pain, pain is 'an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage' (Das, Grimmer and Sparnon, 2005).

There are millions of people throughout the world who experience pain each year (Lathan & Rosensen, 1991). It is a major source of suffering and disability, is extremely frightening for burned children and their families, it impairs recovery, decreases socialization, impairs ambulation and increases health care utilization and costs (Nicola, 2002). According to Summer, Puntillo, Miaskowski, Green, and Levine (2007) acute burn injury pain is not only a source of immense suffering, but has been linked to debilitating chronic pain and stress-related disorders.

All children with burns will experience pain and it is the most serious ongoing discomfort experienced by this cohort of patients, regardless of the cause, size, or burn depth. Pain is

often inadequately treated in children with burn injuries. Studies reported that infants and children are less likely to receive analgesics than adults (Berde and Navil, 2002).
It is also acknowledged that the monitoring and reporting of pain in children has generally been poor. Undertreated pain can result in noncompliance with treatment and, consequently, prolong healing. Due to the adverse physiological and emotional effects secondary to pain, adequate pain control is an integral and requisite component in the management of children with burns (Gandhi, Thomson, Lord and Enoch, 2010)

Procedures such as dressing changes and wound care are common, necessary, and painful, requiring sedation and analgesia in pediatric burn patients. These procedures are often performed on a daily basis on the burn ward, making anesthesiologist involvement impractical. However, physicians and nurses caring for the child are also responsible to relieve the child's pain using various means of pain relief available.

Pain is most often not adequately treated in children with burn injuries probably because of inexperience and unfounded fears of analgesic treatment among medical staff. Patient Controlled Analgea (PCA) is widely administered in high income countries for adults while for children with moderate to severe pain its use is still under evaluation of safety and efficacy. According to Pettersson, Hoflund, Espey & Sharar (2000) continuous intravenous infusion of an opioid provides adequate and good pain control in the intensive care unit but it is not good in general surgical wards. Inadequate resources and health workers in low income countries like Tanzania limit the use of PCA and continuous intravenous infusion of opioid even in intensive care units

There are a limited amount and variety of analgesics available in the country for treatment of burn pain in children at Kilimanjaro Christian Medical Centre (KCMC) hospital. Morphine injections are available but they are underused by health workers (doctors and nurses) in the treatment of burn pain in children due to fear of addiction and respiratory depression. Therapy

of burn pain in children at KCMC hospital is done by using Non-steroid Anti-inflammatory Drugs (NSAIDs) especially injection Diclofenac and oral Paracetamol

According to Harmers, Abu-Saad, Hout, & Halfens (1998), the clinical problem of unrelieved pain has received much attention over the previous decade with a major focus on burn pain. Organizations such as World Health Organization (WHO), American Pain Society (APS) and others have addressed the previously insufficiently addressed areas of pain assessment, pharmacologic treatment and the knowledge and attitude of health care providers (Harmers et al., 1998). The negligence addressed is at least reduced in the high income countries but in low and middle income countries adequate pain management is still an existing problem.

Health policy issues related to pain, including areas of cost, access of care, regulatory perspectives and ethical and legal issues, have likewise been neglected. Although pain management guidelines and protocols have been developed and implemented, unrelieved moderate-to severe pain continues to be reported after burn injury. One reason for this is that the intensity of pain associated with wound care and rehabilitation therapy, the major source of severe pain in this patient population, varies widely over the 3 phases of burn recovery (Inflammatory, Fibroblastic and Maturation), making it difficult to estimate analgesic requirements (Summer et al., 2007)

The amount of opioid consumed in an individual country provides possibly, the best single indicator for moderate to severe burn pain management. WHO monitors morphine consumption in individual countries as an index of improvement in pain management. In Tanzania, there have been difficulties in obtaining and distributing drugs for treating pain due to inadequate funding of health services, lack of health care delivery infrastructure and personnel, inadequate facilities for storage and distribution of medicines and inadequate facilities for patients' pain monitoring.

There appears to be no published study on pain management of children with burn injuries in Tanzania. It was noted that there were increasing need for conducting studies in-country on pain management of burned children in order for the findings to be used in the development of pain management protocols.

1.2. Problem statement

Burn injuries remain a significant public health concern in low and middle income countries like Tanzania, where research and interventions to decrease risk are lacking or inadequate. There is probably no documented research that has been conducted in Tanzania to describe pain management in children with burn injuries.

In Tanzania burns represent 16.3% of all childhood injuries (Roman et al., 2012) which indicates that burn injuries remain a threat in our country in general where there are few specialized burn centres and trained burn care professionals. Pain is the most common symptom experienced by these patients. Pain control in Tanzania is relatively affordable because the medications used are relatively cheap but sadly are often unavailable or, if available given inappropriately.

Health workers have been found to provide inadequate treatment of burn pain to under-ten children, which cause them to suffer unnecessarily (Nicola, 2002). The extent to which burn pain is undertreated in under-ten year old children was unknown in Tanzania. Therefore, the objective of this study was to describe pain management in under-ten year old children with burn injuries admitted at KCMC consultant hospital.

1.3 Significance of the study

This was probably the first study in the country which aims to describe pain management in under-ten year old children with burn injuries. It was of paramount importance to conduct a research study on pain management for children with burn injuries as this will contribute to the development of pain management protocols specific for this country in order to improve the life and reduce suffering in children with burn injuries

The results of this study hopefully will help to understand the therapeutic procedures which require pain relief in burned children, determining the level of pain and their management. It will contribute toward assessment of the magnitude of the problem which will help in identifying possible prevention strategies and better pain assessment and management in order to reduce suffering and enhance the quality of life in these children.

Hopefully, this study will stimulate further research on the topic especially on burn injury prevention strategies and pain assessment and relief methods especially in low income countries.

1.4 Research questions

1. What is the circumstance of burn injuries in under-ten children at KCMC hospital? (Causes, types, severity, pre-hospital treatment)?
2. What is the level of pain experienced by under-ten children with burn injuries admitted at KCMC hospital during therapeutic procedure?
3. Is there a difference between the child's pain score and the nurse's and caregiver's score of the child's pain?
4. What methods are employed to assess and relieve pain in children with burn injuries?

1.5 Objectives

1.5.1 Broad objective

The objective of this study was to assess pain management in children with burn injuries admitted at KCMC hospital

1.5.2 Specific objectives

1. To describe the circumstances of burn injuries in under-ten children admitted at KCMC Hospital
2. To determine the level of pain experienced by under-ten children with burn injuries during therapeutic procedure
3. To compare the child's pain measurement with the nurse's and the caregiver's perception of their pain.
4. To describe the methods used in the assessment and treatment of pain in children with burn injuries according to the nurses perspective

1.6 Conceptual framework

A conceptual framework is a scheme of concepts or variables which a researcher wants to operationalize in order to achieve the intended set of objectives. It is a schematic or diagrammatic presentation of the theory (Onen and Maicibi, 2008). This study used a diagrammatic presentation of a conceptual framework where the relationship between and among dependent and independent variables were explained. In this study burn pain was a dependent variable, where as circumstance of burn injury, level of pain, therapeutic procedures, pain assessment and pain management were the independent variables.

Nurses caring for children with burn injuries are living and functioning in a multicultural world. Pain can be culturally defined by the child, the nurse or the child's caregiver (parent or guardian). Transcultural nursing leads nurses to some ways of knowing and helping children

and their families from diverse cultures and they learn how to provide culturally sensitive, compassionate, and competent care to children with burn injuries (Leininger and McFarland, 2002).

Leininger's Theory of Culture Care Diversity and Universality was used to guide the researcher in discovering meanings, patterns, expressions, feelings, experiences, and practices that influence health and wellbeing of cultures in order to provide appropriate and congruent care. In this study, Leininger's definitions and the Sunrise Model were used as a cognitive map (Leininger and McFarland, 2002).

Leininger considers two kinds of care. Generic care is derived originally and is culturally learned and transmitted lay and traditional, and largely emic folk knowledge and skills used by cultures. In contrast, professional care is formally and cognitively learned etic knowledge and practice skills and is derived etically from largely outside specific cultures from professional and institutional sources. Leininger suggested that both kinds of care have been identified to provide assistive, supportive, and facilitative care for health and well being of people or help people face death or disabilities (Leininger and McFarland, 2002).

This study used two of Leininger's kinds of care, namely, generic care and professional nursing care.

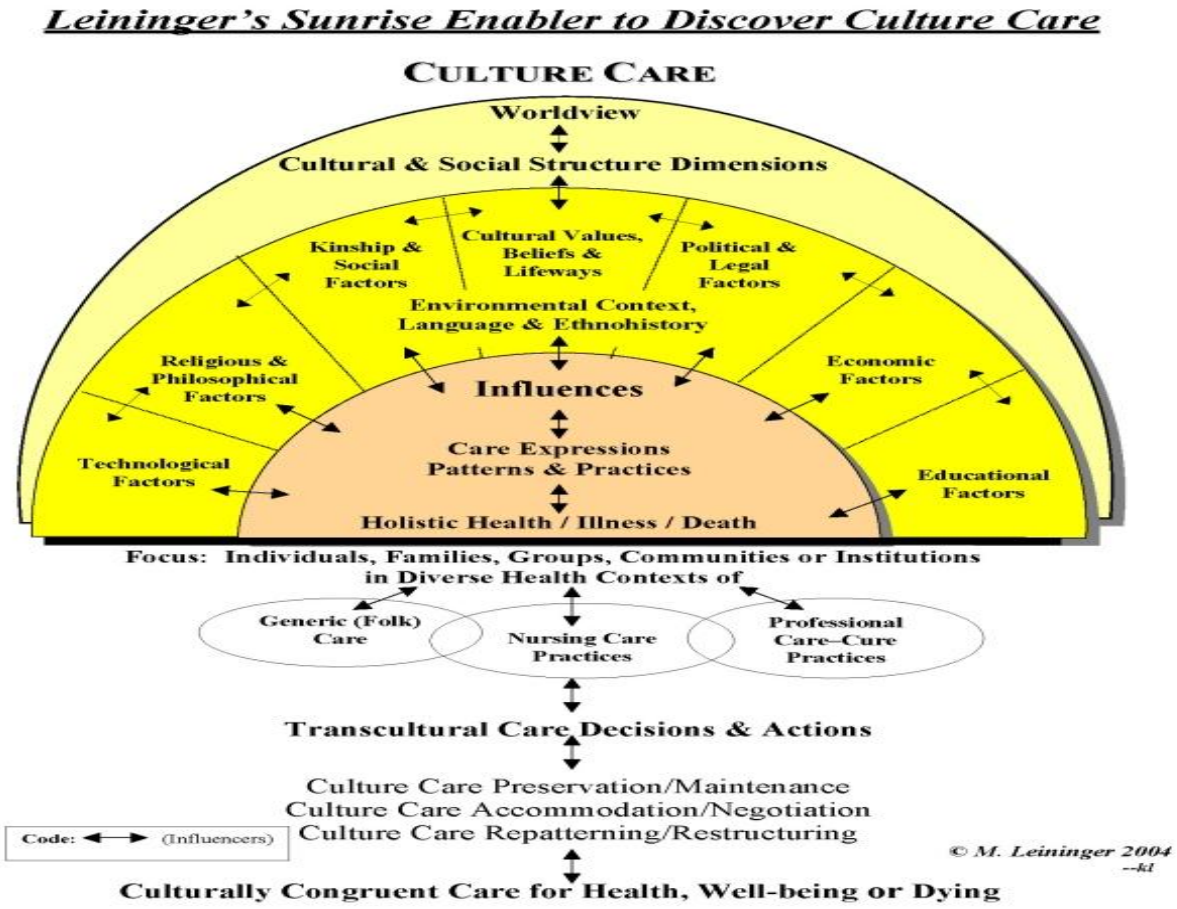


Figure 1**: Leininger's Sunrise Model to depict the Theory of Cultural Care Diversity and Universality**

The domain of inquiry was the assessment of pain management in under-ten year old children with burn injuries admitted in the hospital. The research questions of interest in the ethnonursing inquiry guide were developed from the Transcultural Nursing framework.

The factor of focus in this study was technological factors, following Leininger's Sunrise Model. The technological factors in this study were those factors that lead to effective pain assessment and treatment in under-ten years old children with burn injuries. These factors included: pain assessment tool, physical care including debridement and wound dressing, pain

treatment both pharmacological and non-pharmacological methods. Questions of basic importance are:

Professional care –cure questions: What is the level of pain experienced by under-ten children with burn injuries? What methods are employed to assess the child's pain? What are the methods used to relieve the child's pain (Pharmacological and non-pharmacological)?

Generic (Folk) care questions: What pre-hospital care was employed to relieve the child's pain?

CHAPTER TWO

2.0 Literature review

This section deals with the peer review literature on the problem of pain management in children with burn injuries. This literature review focus on children covering two areas which are burns, and pain (pain assessment and management). This literature review on problem of burns and pain in children assisted the researcher to formulate appropriate research objectives and gain further insight into the problem.

2.1 Burn injuries in under ten years children

A burn is an injury to the skin or other organic tissue primarily caused by heat or due to radiation, radioactivity, electricity, friction or contact with chemicals. 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 (WHO, 2013)

Globally, injuries and deaths from burns are serious, yet largely preventable public health problem. It is estimated that more than 300,000 persons die each year worldwide because of fire-related burn injuries (Torpy, Lynm, and Glass, 2009; Parbhoo, Louw and Grimmer-Somers, 2010a). It is estimated that there are about 195,000 deaths each year from fire alone. Deaths due to fire alone rank among the 15 leading causes of death among children and young adults 5-29 years (WHO, 2012). Many more are seriously injured, disabled, or disfigured because of all types of burns.

Burn injuries are more common in low and middle income countries such as Tanzania. Low income countries being mostly affected, carry 95% of all burn injuries. Studies of childhood injuries in Africa have ranked burn injuries as the top three cause of injuries and the second most common cause of accidental death in children younger than five years and the most common cause of accidental death in the home (Hyder, Kashyap, Fishman and Wali, 2004; Chalya et al., 2011).

In Africa Region, burn injuries are common in under-ten year old children. They contribute to 4.8% of trauma deaths and 18% of total hospital admissions of injured children in Africa (Oluwatosin, 2004). Approximately 56% of pediatric burn injuries occurred in the 0-4 year age and the incidence ranged from 0.28 to 16.3 percent per year (Hyder et al., 2004). A study conducted in Kenya revealed that burn injuries constitute 3% of all injuries and 13% of all surgical admissions while the prevention and treatment measures are still poor (Masiira-Mukasa and Ombito, 2002).

In Dar es Salaam, Tanzania burns represents 16.3% of all childhood injuries (Roman et al., 2012) which indicates that burn injuries remain a threat in our country in general where there are few specialized burn centres and trained burn specialists. It contributes to high morbidity and mortality which necessitates institution of aggressive critical preventive measures and management strategies (Chalya et al., 2011)

Most burn injuries occur at home. Some of the risk factors for burn injuries in children in low and middle income countries include poor architectural design of cooking places with an open flame, open cooking facilities on the ground floor of a building or residence, wearing loose clothing while cooking, smoking among adults, alcohol use among adults, water heaters that are set too hot, poor electrical safety, and unsupervised children (Torpy et al., 2009).

Burns are common in low and middle income countries such as Tanzania and fire related deaths are numerous in Africa compared to high income countries in Europe (Ekvall, 2010). This is because in low and middle income countries there are few efforts in the prevention and care compared to high-income countries. In vulnerable populations, burn injuries are reported to be the third most common cause of death in children aged 5 to 14 years (Parbhoo, Louw and Grimmer-Somers, 2010b). In 2004, 11 million burns requiring medical care occurred worldwide (Summer et al., 2007). According to the same author about 90% of burns occur in the developing world and 70% of these are in children.

In the 1970's in Dar es Salaam burns accounted for 25% of the injuries in children (Sarungi and Kaduri, 1980). Most of them occurred in suburbs of Dar es Salaam where housing conditions are not very safe and cooking takes place in corridors or in a single sleeping-cum-sitting-cum-store-rooms where the contacts between the child and the burning agents is increased (Sarungi and Kaduri, 1980).

Burns are the most common cause of paediatric injury worldwide resulting from hot water, flames, hot surfaces, chemicals and electrical appliances. However, scalding, most often self precipitated is the most common cause of burn injuries in children. Flame burns are less common but more severe and have a higher mortality than scalds (Durtschi, Kohler, Finley, Heimbach, 2008).

Thousands of children suffer burn-related injuries each year. Children aged 5 years and under are at the greatest risk, with an injury death rate more than two times that of children aged 5 years to 14 years (NSKC, 2004). Scald burn injury (caused by hot liquids or steam) is the most common type of burn-related injury among young children, while flame burns (caused by direct contact with fire) are more prevalent among older children. In Tanzania, the most common contributor to burn injuries in children are flame (36.9%) and hot liquids (33.8%) (Roman et al., 2012).

All children are also at risk for contact, electrical and chemical burns. Because young children have thinner skin than older children and adults, their skin burns at lower temperatures and more deeply (NSKC, 2004).

According to Senarath-Yapa and Enock (2009) burn injuries are described in terms of degrees of burn which refers to the severity of the injury. Proper treatment depends on the severity of the burn. There are first, second and third degree burn injuries depending on the extent and depth of injury to the skin. First degree burns usually involve only the top layer of the skin and result in redness to the top layers of the skin. The skin may feel warm and painful to the touch.

The second degree of burns results in red, blistering skin. The deeper layers of the skin are affected with this degree of injury and the victim is usually in significant pain. Third degree burns go all the way through the skin involving the full thickness of the skin where there is destruction of nerves and blood vessels. Skin that has been damaged by a third degree burn may appear black or white. The nerve endings have been destroyed so the affected area might not hurt but the area adjacent to it will likely hurt. A burn of this severity may cause the victim to go into shock

A useful method for classifying burns in children is by the use of Wallace's Rule of Nine, which divides the body by surface area: each upper limb 9%, each lower limb 14%, anterior and the posterior trunk each 18%, and head and neck 18% (Senarath-Yapa and Enock, 2009).

According to Gandhi et al., (2010), the severity of burn injuries are classified as minor, moderate or major. Minor burns are those that are partial-thickness burns less than 10% total body surface area in children and do not apply to burns that include includes eyes, ears, face, hands, feet, or perineum. Minor burns also include full-thickness burns less than 2% TBSA children. Moderate burns are those partial-thickness burns between 10% and 20% TBSA in children or less than 10% full-thickness burn. This category also excludes burns to the eyes, ears, face, hands, feet, or perineum, which always need specialized burn care. Major burn injuries are partial-thickness burns above 20% in children. Full-thickness burns greater than 10% TBSA are also included

2.2 Pain in children with burn injuries

Pain is a noxious stimulus which can be interpreted in many ways by different individuals but yet the mechanisms by which the body manages it are not completely understood. According to the International Association for the Study of Pain, pain is 'an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage' (Das, Grimmer and Sparnon, 2005).

Pain is frequently related to physical causes such as inflammatory processes and nociceptive transmission of pain messages. The pain experience is entirely subjective, which makes objective measurement of pain difficult. The way in which pain is experienced depends on many factors, including past experiences, memory, understanding of pain, cultural conditioning and pain threshold (Das et al., 2005). Most burn pain results from tissue damage. Pain from nerve damage may be present, particularly in patients with amputations or limb evulsions. Pain from nerve damage is often treated differently than conventional burn pain.

All children with burns will experience pain, regardless of the cause, size, or burn depth, and therefore undertreated pain can result in noncompliance with treatment and, consequently, prolonged healing. It is acknowledged that the monitoring and reporting of pain in children with burns has generally been poor. Due to the adverse physiological and emotional effects secondary to pain, adequate pain control is an integral and requisite component in the management of children with burns (Gandhi et al., 2010)

Burns have long been recognized as among the most painful and devastating injuries a person can sustain and survive. Burns often require long periods of rehabilitation, multiple skin grafts and painful physical therapy such as dressing changes, and they can leave victims with lifelong physical and psychological trauma (NSKC, 2004). Therapeutic procedures are accompanied by severe and intense pain which require clinicians involved in the care of children with burn injuries use the best available methods to reduce procedural pain (Summer et al., 2007). Therefore, adequate and appropriate pain management is essential to ensure that symptoms secondary to pain experience do not become habitual

In children burns are distressing, accompanied by ongoing pain, cosmetic and physical disfigurement, impairment, multiple dressing changes and surgical procedures (Parbhoo, Lown and Somers, 2010a). In addition, burns in children cause ongoing emotional and

psychological impact on the side of the child and caregiver or parents (Parbhoo et al., 2010a). Since burns are preventable, appropriate measures and interventions addressing the causes of burns in children is essential in order to minimize pain, trauma, sufferings and disability which can affect the child's livelihood. Prevention of burn injuries will also reduce health care costs on the side of vulnerable group and the health care system.

In terms of treatment, pain during hospitalization can be classified as background (that which is present while the patient is at rest; pain of lower intensity and longer duration), procedural (more intense, short-lived pain generated by wound care or therapies), breakthrough (spiking of pain levels that occur when current analgesic efforts are exceeded), and post-operative. Chronic pain is that which lasts longer than six months; this type can be a challenge for outpatient therapy.

Wound care and therapies can generate pain that is equivalent or exceeds that experienced by the patient at the time of the injury. Pain, in addition to being a source of outright suffering in patients, can interfere with wound care and therapies as well as lengthen hospitalization. Moreover, the amount of pain experienced by hospitalized children with burn injuries appears associated with long-term post-traumatic stress and general emotional distress. As such, there are practical as well as humanitarian reasons to control burn pain in children aggressively (Summer et al., 2007).

2.3 Pain assessment in children

Pain assessment can be considered the 5^{th} vital sign to be included in the normal traditional vital sign (Temperature, Pulse, Respiration and Blood pressure) for improving the efficiency of pain treatment. Assessment of pain in children requires a multidisciplinary approach which helps to integrate pharmacological and psychological pain relieving interventions to reduce physical, emotional, and family distress. Special attention should be paid to the child's

environmental conditions; the parent's presence and participation in the procedure can be highly beneficial (Gandhi et al., 2010)

Children have difficulty in expressing their pain and problems; this is the major contributing factor to poor pain assessment and management where the health professionals may have problems in interpreting and assessing its information correctly (Topcu and Findik, 2012). Therefore, it is vital to assess the pain accurately to gauge the severity of pain and the effectiveness of its treatment and this provide a guide in the choice of pain relieving method.

The pain experienced by burned children also varies greatly; therefore, analgesia needs to be tailored on an individual basis. In order to achieve this aim it is essential to measure pain in a simple and reproducible manner. Assessment tools are essential to the diagnosis of underlying burn pain syndromes and the effectiveness of their treatment (Summer et al., 2007)

There are various measurement tools available for assessment of pain in children (Summer et al., 2007). In the burned children population, the most common pain assessment tools are verbal self report instruments that measure pain intensity, visual analog scale, descriptor, face and color scales are also used. Other tools are the "FLACC tool" and the "Faces Ladder Scale" as these are simple, effective, and quick to use. However, irrespective of the tool adopted, the frequency of measurement should be tailored to the appropriate stage in the burn management. Whenever possible the child's self-report should be used to assess pain. However, there are situations where this may not be possible, especially in infants or in those with cognitive impairment or language difficulties. In such instances, the FLACC tool should be used. This tool is especially useful for children up to four years old. However, older children 4 years and older can communicate and make judgments about their pain. Also Wong-Baker FACES Pain Rating Scale is recommended for children 4 years and older (Das et al., 2005).

3.7.2 Description of the Pain Assessment tools

Visual Analogue Scale (VAS)

The child's self-report should be used to assess pain. However, this method is applicable only in children with no cognitive impairment or language difficulties. In this study child's self report tool, VAS was used to children of 6 years and above because of their higher cognitive and language development. Children 6 years and older can communicate and make judgments about their pain (Das et al., 2005).

As shown in Appendix "A" VAS is a horizontal line, 100mm in length, attached to word descriptions at each end, "not hurting" or "no pain" to "hurting a whole lot" or "severe pain" (Srouji, Ratnapalan, and Schneeweiss, 2010). The children, nurses and caregivers were asked to mark on the line the point that they feel represents their pain at this moment (Taylor, 2010). Using a Visual Analogue Scale (VAS) helps to optimize pain control by doing frequent assessment of pain severity (Summer et al., 2007). In VAS children, nurses and caretakers were told to rate their pain or the child's pain on a 0-10 scale in order to determine their level of pain. On the scale 0 = no pain, 1-2 = slight pain, 3-4 =annoying pain, 5-6 = significant pain, 7-8 = severe pain and 9-10 = excruciating pain

The limitation VAS is that, it may not be possible to apply for example, in infants or in those with cognitive impairment or language difficulties.

The Faces Legs Activity Cry Consolability Scale (FLACC)

In this study FLACC was chosen for children under 6 years because infants and younger children are developmentally too young to be able to accurately describe their pain. According to Srouji, Ratnapalan, and Schneeweiss, (2010) FLACC is a behavioral scale for measuring the intensity of pain in young children. It includes five indicators (face, legs, activity, cry, and consolability) with each item ranking on a three point scale (0–2) for severity by behavioral descriptions resulting in a total score between 0–10. As shown in Appendix "B" FLACC is an easy and practical scale to use in evaluating and measuring pain especially in pre-verbal children from 2 months to 7 years. Numerous studies have proven its validity and reliability

2.4 Pain treatment in children

2.4.1 Pre-hospital first aid treatment

Treatment with traditional preparation is the most popular first-aid of choice provided to children immediately after burn injury at home or at the injury scene in Africa (Temu, Rimoy, Premji, and Matemu, 2008). Traditional preparations often have some microbial complications since people who prepare these traditional remedies do not employ aseptic procedures, and therefore treatment with these remedies is prone to induce infections. Most wound complications found in clinical areas for children are mostly associated with treatment of burns by traditional preparations (Temu et al., 2008).

Most of these traditional remedies are given for the purpose of relieving pain and to stabilize the child before being transported to hospital through first aid. In a study done in Ghana cool water was applied to the burned area in 30 percent of the cases (Forjuoh, 2006)The first aid is usually given by family, bystander or first responders the aim being to cool the burn with cool water, prevent ongoing burning and prevent contamination. Unfortunately, other first aiders use inappropriate treatment such as raw eggs, toothpaste, mashed potato or oil being rubbed into the burn (Peden et al., 2008)

Traditional pre-hospital treatment was found being practiced in Ethiopia where they used first aid remedies for burns where they preferred things such as butter or palm oil, row eggs yolk, milk, salt, cow dung and dirt or soil. In Kenya they preferred treating with plants and plant juices and covered with large tropical banana leaves (Albertyn, Bickler, Rode, 2006).

In other parts of Africa traditional first aid may also involve the application of gentian violet, honey, starch, antibiotics powder, washing with salty water, and a variety of plants and herbs to the burned area (Forjuoh, 2006).

In Tanzania a study by Temu et al. (2008) conducted to determine the cause, magnitude, and management of burns in Under-tens in district hospitals, Dar es Salaam, Tanzania revealed that immediately after burn 87.3% of the children had first aid applied on their wounds while

12.7% didn't apply anything. Of the agents used, honey was the most used (32.8%) followed by cold water (16.7%). According to the same author, other first aid treatment given to the children immediately after burn were sugar, raw eggs, burn cream, animal fur, cooking oil, petroleum jelly, animal dung, charcoal, mud and kerosene.

2.4.2 Pharmacological pain treatment

Unfortunately, burn pain is very likely the most difficult form of acute pain to treat from any type of etiology (Summer et al., 2007). Managing and controlling pain in children with burn injuries is a challenge from the scene, initial emergency room care through the treatment and rehabilitation phases of care

Pain is one of the most frequent complaints presented in paediatric burn patients. It is important therefore for nurses to follow a child centered or individual approach in their assessment and management of pain and painful procedures. The development of more effective methods of relieving pain associated with burn injury is a major unmet medical need (Summer et al., 2007).

The current burn pain treatment in children at KCMC Hospital comprises administration of a number of medications, including analgesics, muscle relaxants and hypnotics. These drugs are given to reduce procedural pain experienced by children; however, they have unwanted side effects such as drowsiness, nausea, reduced postural control and lethargy (Omar, Hegazy and Mokashi, 2012).

One clear goal is to avoid the undertreatment of pain, an unfortunate reality in the settings of pediatric burn care, and more historically described for other acute pain settings. Omar et al. (2012) noted in USA that burn staff members failed to medicate patients adequately with opioids, despite education regarding the low risks for addictive and other side effects. Fear of creating dependence and addiction on opioids may explain the reluctance of some burn care

staff to aggressively treat burn pain. However, there is currently no evidence that opioid addiction occurs more commonly in burned children than in other populations of patients requiring opioids for acute pain (Loeser, 2001).

Those children with burns extensive enough to require hospitalization means that their burns are severe and they require pain control using potent opioids. Children with minor burns will require less potent analgesics provided by using non-steroidal anti-inflammatory drugs (NSAIDs) (Loeser, 2001). However, when these potent analgesics are combined with opioids they are of value as they reduce the dose requirements of opioids (Loeser, 2001).

In addition burn pain control will depend with the type of pain whether background, procedural, breakthrough and postoperative pain. Background pain is best treated with mild to moderately potent analgesics administered so that plasma drug concentrations remain relatively constant throughout the day which may be provided by intravenous infusion of morphine.

In contrast, procedural pain is more intense with shorter duration and requires moderately high potent opioids with shorter duration achieved by intravenous phentanyl or Ketamine. And post operative pain following excision and grafting requires special attention because of increased analgesics needs (Loeser, 2001)

2.4.3 Non-pharmacological pain treatment

There are various nonpharmacological strategies that can be employed to treat pain in children with burn injuries whether background or procedural pain. These are such as education (understanding of the condition), distraction, relaxation, cutaneous stimulation, acupuncture, bio-feedback, hypnosis, imagery, cognitive, talking, singing, praying, describing photographs, listening to music, and playing games. These can be employed to treat the pain associated with burns (Topcu and Findik, 2012).

Non-pharmacological techniques reduce the perception of pain by stimulating the descending control system that leads to painful stimuli being transmitted to the brain (Topcu and Findik, 2012). A good understanding of the procedure helps children to control their anxiety cognitively, thus, helping to gain a level of pain relief. This not only corrects misconceptions and decreases anxiety but also allows children to play an active role in the procedure and to benefit fully from pain-reducing strategies. When used in conjunction, these modalities help reduce analgesic requirements (Topcu and Findik, 2012).

CHAPTER THREE

3.0. Methods

This chapter describes the research design and methodology, including the population, sampling, data collection methods and analysis.

3.1 Study design

The research design is the researcher's overall plan for obtaining answers to the research questions guiding the study (Polit and Beck, 2008. The study followed descriptive cross-sectional design which used quantitative methods. In this cross-sectional study, data were collected at one point in time. The phenomena under investigation were captured as they manifested themselves during a period of data collection (Polit and Hungler, 1998).

In descriptive studies the researcher collected detailed descriptions of under-ten burn injuries and their pain management. The purpose of the current descriptive research was to provide the opinions of subjects regarding burn injuries and their pain assessment and management. According to Burns and Grove, (2005) descriptive research provides an accurate account of the characteristics of a particular individual event of group in real-life situations for the purpose of discovering new meaning, describing what exists, determining the frequency with which something occurs, and categorizing information. In this study the researcher attempted to determine and describe the magnitude of burn injuries in Under-tens and their pain management at KCMC hospital

Quantitative research is a formal, objective, systematic process in which numerical data are used to obtain information about the world (Burns and Grove, 2005). In the proposed study quantitative methods was used to describe subjects and burn injuries including determining the circumstance of burn and their pain management in under-ten year old children admitted at KCMC hospital. In addition quantitative methods was used to determine the level of pain

experienced by children with burn injuries according to the child's, nurse's and caretaker's perspectives; and also the methods employed in pain assessment and treatment

3.2 Area of study

The study area or research setting is the environment in which the research study takes place and can be a natural or controlled environment. According to Leininger's Sunrise model the setting of ethnonursing inquiry can be individuals, families, groups, communities or institutions (Leininger and McFarland, 2002). This ethnonursing study took a focus at the institution as it was conducted in surgical wards at Kilimanjaro Christian Medical Centre (KCMC). KCMC hospital is one among the four consultant hospitals in Tanzania. Other consultant hospitals in the country are Muhimbili National Hospital located in capital city of the country Dar es Salaam, Mbeya consultant hospital located in the southern highlands of the country and Bugando consultant hospital located in North West of the country in Lake Zone. KCMC consultant hospital is located in North East part of the country in Moshi rural district, Kilimanjaro region which serves as a tertiary referral hospital for Northern part of the country covering the following regions; Tanga, Kilimanjaro, Arusha, Manyara and Singida. KCMC has a catchment area of almost 15,000,000 persons, the largest of any referral hospital in Tanzania (KCMC annual report, 2010).

KCMC currently has 457 inpatient beds with more than 20,500 admissions, 3000 births, and over 110,000 outpatient visits. KCMC is an Institution of the Good Samaritan Foundation of Tanzania and one of the teaching and consultant hospitals. It is located in the foothills of the snow capped Mount Kilimanjaro. Services provided at KCMC include pediatric care, medical services, surgical, obstetric care and urology. Currently KCMC hospital is lacking a burn unit where adults and children with burn injuries are admitted in general surgery ward. However, an independent building for burn unit is currently under construction

Kilimanjaro region is located in the North East of Tanzania Mainland. It has seven districts which are Same, Mwanga, Rombo, Moshi rural, Moshi urban, Hai and Siha. The region is comprised of one Regional hospital called Mawenzi Hospital which serves as a secondary referral facility for Kilimanjaro region. The district hospitals are St Joseph's Hospital is a District Designated Hospitals (DDH) which serves as a Moshi Municipality hospital located in Moshi town. Kilema and Kibosho are DDHs for Moshi rural district and Huruma Hospital also is a DDH for Rombo district. Same Hospital is a government district hospital for Same district.

KCMC hospital was chosen in this study because a large proportion of children with major burn injuries are admitted there for expert care at the consultant hospital. Major burns are sources of severe pain in this cohort of children. The researcher worked as a nurse in KCMC for 10 years, mostly in the pediatric wards and therefore is known there, so access was not complicated.

3.3 Target population

According to Polit and Beck (2008), a population is the total number of people or elements that fit the specific set specifications of the study. Leininger's Sunrise model identified four focus of research inquiry which is individuals, families, groups, communities or institutions (Leininger and McFarland, 2002).

In this study the focus population was individuals who are under-ten year old children with burn injuries admitted to KCMC hospital, nurses caring for these children and the caretakers of children with burn injuries.

This cohort of children were chosen because literature shows that burn injuries are common in this age group and pain assessment and management is difficult which causes their pain to be neglected by health workers and caretakers and therefore, unattended. For example, a study

done to describe patterns and perceptions of prevention of childhood burn injuries in Children in Dar es Salaam showed that burn injuries were most common in children aged less than ten years where 63.6% were aged 0-4 years and 21.3% were aged 5-10 years (Mbembati, Museru, Leshabari, 2002). Also a study done by Mbanga and Mwafongo (1998) to describe a profile of burn injuries in Dar es Salaam showed that the age group of 0 – 4 years accounted for 50.3% of all the cases. Therefore, the researcher thought that this cohort of patients' pain is highly neglected which makes them suffer unnecessary pain which can be relieved to enhance their quality of life and hasten their recovery.

3.4 Eligibility criteria

From the study population the researcher should clearly state the criteria for inclusion and exclusion:

3.4.1 Inclusion criteria

Inclusion criteria for children

The inclusion criteria were the characteristics that the respondents must have possessed in order for them to be included in the study. The respondents included in this study were:

- All under-ten years old children with burn injuries admitted at KCMC hospital

Inclusion criteria for nurses and caretakers were:

- All nurses caring for eligible burned children admitted at KCMC hospital
- All caretakers of eligible burned children admitted at KCMC hospital

3.4.2 Exclusion criteria for children

Exclusion criteria are the characteristics that the respondents were lacking in order to be included in the study (Burns and Grove, 2001). In this study children with the following characteristics were excluded from the study:

- Children aged ten and above years
- Unconscious children with burn injuries were excluded because self pain assessment for them could be difficult
- Children six years and above who were unable to use VAS due to physical disability caused by burn injury

3.5 Sampling

Sampling is a process of selecting a portion of the population to represent the total population and the findings from the sample represent the rest of the population. The selected sample should therefore have similar characteristics to the population under study to allow generalizability of the results (Burns and Grove, 2001; Polit and Beck, 2006).

3.5.1 Sampling for children

All under-ten children with burn injuries admitted at KCMC between 8th May and 30th June were conveniently included in the study. The researcher strived to obtain information about the circumstance of the burn injury in these children through their caregivers and also intensity of their pain was assessed by using a pain assessment tool.

3.5.2 Sampling for Caregivers

The researcher included all caregivers of children who met the criteria for inclusion into the study. Caregivers were requested to score his/her child's pain on a VAS so that the researcher can compare the child's score of pain and that of the caregiver and to see if caregivers understand the child's pain. This helped understand if caregivers perceived the child's pain the way the child experienced it

3.5.3 Sampling for Nurses

Convenient sampling was used to recruit all nurses into the study who were caring for children with burn injuries. A total of 36 nurses were working in surgical ward caring for children with burn injuries.

3.6 Sample size

3.6.1 Sample size for children

According to Polit and Beck (2006) quantitative research designs require large samples to increase representativeness and reduce sampling error. In this study, since quantitative data was obtained from and about burnt children, then, a statistical formula was used to obtain their sample size. Since burn injuries represent 16.3% of all childhood injuries this proportion was used by the researcher to calculate the sample size. The formula for sample size calculation used was as follows (Kirkwood, 2003):

$$n = \frac{Z^2 P(1-P)}{d^2}$$

Where; n = sample size

Z = Z statistics for a level of confidence i.e. 1.96 (95%)

P = expected proportion or prevalence = 16.3%

d = precision 5%, d = 0.05)

Using proportion of 16.3%, precision of 5% and confidence level of 95%,

Substituting, this gave:

$$n = \frac{(1.96)^2(0.163)(1-0.163)}{0.05^2}$$

=209 children with burn injuries

Adding 10% of this value to take care for possible non-response gave:

= 209x10/100 = 21

Therefore, sample size will be 209+21 = 230 children with burn injuries

Reflection on actual sample size and power calculation

The sample size for this study was expected to be 209 participants. However the study ended up with 47 participants. The small sample size in this study makes low power of the study and hence biased due to less external validity for the whole study.

3.6.2 Sample size for caregivers

All caregivers of children recruited in the study were selected into the study.

3.6.3 Sample size for nurses

Twenty three nurses working in general surgery wards caring for children with burns were recruited in the study. The number of nurses who were estimated in the study was the same to number of children in the study. However due to difficulty in getting participants the number of children obtained were 47 and hence it was expected that same number of nurses would participate. Due to the fact that some nurses were found more than once caring for these children they were counted once.

3.7 Data collection methods

Data collection is a systematic process in which the researcher collects relevant information to achieve the research purpose and objectives. Polit and Beck (2008) defined data as information obtained during the course of an investigation or study. Data in this study was collected in May and June 2013.

3.7.1 Data collection instruments

Data collection instruments refer to devices used to collect data such as questionnaires (both structured and unstructured), tests, structured interview schedules, interview guides and checklists. Data collection instruments used in this study were:

Semi-structured questionnaire

Data about the burnt child was collected by using a semi-structured questionnaire administered by the researcher which contained open- and closed-ended questions, as shown in Appendix "D". The information was obtained from the caregiver and information about depth and TBSA burn from the child's file.

Questionnaire was used to obtain demographic information; information on circumstance of burn; and to determine the pain intensity as experienced by the child and as perceived by nurses and caregivers. The questions were read by the researcher to the caregiver and the researcher filled in the answers exactly as said by the caregiver.

The data on the questionnaire included demographic variables (age, sex, place of residence and caretaker); information about circumstance of burn (include type and motive of burn, TBSA burned, depth of burn, and the time taken for the child to present in hospital); information about treatment (pre-hospital care immediately following burn and pain treatment in hospital), and information about level of pain.

Unstructured questionnaire

Data was collected from nurses taking care of the children with burn injuries using unstructured questionnaire which contained open-ended questions. As shown in Appendix "F". The information was obtained about pain assessment (methods used, tools used) and pain treatment (pharmacological and non-pharmacological methods) and factors which prevent effective pain management.

Pain Measurement tools

An appropriate pain assessment tool for children is vital, especially when they are too young or unable to tell the nurse about their pain. There are many tools available and a specific one needs to be chosen according to the patient's age and level of understanding (Taylor, 2010).

For children below 6 years of age a FLACC tool was used. Children 6 years old and above were asked to score their average pain intensity experienced using VAS. The child's pain was measured during therapeutic intervention/procedures i.e. wound dressing and debridement.

At the end of measurement both pain measurement scales used VAS and FLACC end up with 0-10 score of pain, therefore, the scores are comparable which have the same meaning and interpretation.

Nurses and caregivers were requested to score child's pain by using VAS. Their pain score was thought to reflect their perception of the child's pain that they were taking care of. Their pain score was compared with that of the child during data analysis. They were requested to score the child's pain by using VAS so that the researcher could compare the child's score and the nurse's and caregivers score of pain and also be able to see if nurses and caregivers perceived and understand the child's pain the way the child was experiencing it. One nurse might have scored more than one child.

All pain assessment tools were in English language. A Swahili version of VAS was developed for use among children 6 years and above and caregivers because of their difficulty to use English version.

3.7.3 Data collection procedure

Data collection procedure for children

Children under 10 years with burn injuries were identified through nursing staff at surgery wards in KCMC Hospital. A semi-structured questionnaire with open- and close-ended questions was used to gather information about circumstance of burn and pain management. The informant about the child was the child's caregiver.

The researcher assessed the child's burn wound in order to obtain information about the extent and severity of injury i.e. depth of wound and TBSA burned. The researcher lastly measured

the pain intensity of the child by using appropriate pain assessment tools according to the child's age in order to determine the intensity of pain that the child was feeling. The pain intensity was measured during any painful procedure mainly wound dressing and debridement

Questionnaire administration

After identifying the child through the nursing staff at the surgery wards in KCMC Hospital, caretakers of child was interviewed on behalf of the child by using a semi-structured questionnaire to obtain demographic information, circumstances of burn and pre-hospital care offered. The researcher read the questions to the respondent and also helped to fill in the information exactly as said by the respondent.

Then the researcher assessed the child's burn wound in order to obtain information about the extent and severity of injury i.e. depth of wound and TBSA burned. The researcher lastly measured or asked the child to score the pain intensity by using appropriate pain assessment tool according to the child's age in order to determine the intensity of pain that the child is feeling. The pain intensity was measured during the therapeutic procedure being dressing or slaughectomy. The tools used were FLACC for children under 6 years; VAS for children 6 years and above; and VAS scale for nurses and caretakers.

Pain measurement procedure

Children 6 years old and above were asked to score their pain on a VAS. Children were instructed by the researcher on how to use the tool, they were given time so that they understand and become used to the tool. Then they were asked to rate their pain on a 0-10 visual analogue scale in order to determine their level of pain. They were instructed by the researcher that on the scale 0 = no pain, 1-2 = slight pain, 3-4 =annoying pain, 5-6 = significant pain, 7-8 = severe pain and 9-10 = worst pain possible. Lastly, the researcher recorded the pain scores they rated.

For children less than 6 years of age FLACC tool was used. The child was observed by the researcher for 2–5 minutes and each the child's behavior on each category was noted. Then the child's total score was recorded during therapeutic procedure while they have been given their routine analgesia or non-pharmacological intervention.

Also nurses and caregivers were asked to score the child's pain on a VAS. They were instructed by the researcher on how to use the tool, they were given time so that they understand and become used to the tool. Then they were asked to rate the level of child's pain they think he/she was experiencing during the procedure of wound dressing or sloughectomy on a 0-10 visual analogue scale. They were instructed by the researcher that on the scale 0 = no pain, 1-2 = slight pain, 3-4 =annoying pain, 5-6 = significant pain, 7-8 = severe pain and 9-10 = worst pain possible. Lastly, the researcher recorded the pain scores they rated on a VAS.

Data collection from nurses

Information from nurses was used to describe the methods of pain assessment and treatment in children with burn injuries according to nurse's perspective. Questions were designed to obtain their experience and perspectives about pain assessment and treatment in children with burn injuries they were caring for. Data was collected by using an unstructured questionnaire with open-ended questions. Interviews using unstructured questionnaire with open-ended questions were thought to increase insight into about pain management in children with burn injuries. Open ended questions elicited unstructured talk from participants about their experiences, perspectives and opinions.

3.8 Pre-test of data collection tools

In order to ensure validity and reliability of the data, tools were pre-tested on ten under-ten children with burn injuries, caregivers and nurses at Muhimbili National Hospital (MNH) to check the clarity of questions, accuracy of pain assessment tools and their acceptability and

identify vague questions so that adjustments can be made on the outcome of the pre-test results. The data collected during the pre-test were not the part of the study.

There are many pain assessment tools and formulations available in the literature. Since it is a new technology in Tanzania, it is not clear which is the most appropriate tool or formulation to use in underten years old children. Therefore, the researcher pre-tested VAS and Face/ladder scales and their formulations for children 6 years and above and found that VAS works better than Face/ladder scale for children 6 years old and above and children mostly preferred to use Morfin Meda scale. Therefore, for children 6 years of age and above the researcher used Morfin Meda scale which is a formulation of VAS to measure their pain. And FLACC tool worked well for children under 6 years. For caregivers and nurses also Morfin Meda scale (Appendix "A") was the preferred formulation of VAS.

Regarding the questionnaire, the Swahili version questionnaire were pre-tested and only few typographical errors were identified and corrected

3.9 Validity and reliability of the study

Reliability

Reliability is the degree of consistency with which the data collection instrument produces the same results every time it is implemented in the same situation or used by different investigators (Burns and Grove, 2005). To ensure reliability, the researcher pre-tested the questionnaires, and pain assessment tools to children, nurses and caretakers with the same attributes at burn unit, Muhimbili National Hospital (MNH) who would not be part of the sample. This was done to identify vague, unacceptable, questions, acceptability and usability of pain assessment tools and consistency of results. After pre-testing the pain assessment tools, VAS scale was found to be appropriate for children 6 years and above and FLACC was appropriate for children below six years. VAS also was found to be good for nurses and caretakers.

Validity

Validity is the extent of accuracy of an instrument to measure the construct it is supposed to measure in the context of the concepts or variables being measured (Polit and Beck, 2006). A semi-structured questionnaire, the unstructured questionnaire and the pain assessment tools were developed after reviewing of relevant literature in order to incorporate and measure important variables in the study. The researcher and supervisors closely examined the questions in the questionnaire and interview guide to ensure that they measure the desired variables. The questionnaire was also given to an independent lecturer from MUHAS to go through and evaluate the face and content validity as well as the components of the questionnaire if it reflects the objectives and purpose of the study. The appropriate pain assessment tools were selected by researcher after consultation of the supervisor who is expert in pain.

3.10 Data processing and analysis

Both semi-structured and un-structured questionnaires were checked for completeness of the data filling at the end of each day. Data from the semi-structured questionnaires were coded and cleaned then the statistical data was entered and analyzed by the researcher using SPSS version 20 software computer program. Common responses from un-structured questionnaire were identified, grouped and entered into SPSS software computer program and their frequencies and percentages were calculated

Descriptive statistics i.e. percentage, frequency, mean, average X^2 test, t-statistic and F-statistic were used in the data analysis and interpretation. A p-value of less than 0.05 was accepted as the statistical significant limit.

3.11 Ethical considerations

Children are vulnerable and consequently in need of protection from exploitative researchers. Children are vulnerable firstly, because of their physical weakness, and their lack of knowledge and experience, which renders them dependent upon the adults around them. Secondly, they are structurally vulnerable because of their total lack of political and economic power and their lack of civil rights (Polit and Beck, 2006).

Therefore, having this in mind researcher ensured that adult's responsibility to their children was fulfilled and that children did not suffer harm at any stage in the research process. To ensure safety and protection of children researcher abided to ethical principles of research throughout the research process.

Ethical clearance was sought from the MUHAS Research and Publication Committee. Permission to conduct the study was then asked from Executive Director, KCMC hospital. A written informed consent was requested from the parents/caretaker of the child with burn injuries admitted at KCMC hospital

Ethical consideration for Caretakers

Caretakers were given explanation of the research procedures, its purpose and expected duration of child's participation in the research process. Then consent for the eligible child to participate in the research process was sought from the caretaker. Their children were recruited in the study after they have signed a written consent. Sufficient time to examine the consent form and ask any questions regarding the study was provided.

Caregivers were assured of the child's confidentiality and they were informed that participation is voluntary and their children can drop out of the study at anytime without loss. Caretakers were asked to choose a place for the interview where they feel comfortable and confident

Ethical consideration for nurses

An explanation of the research procedures, its purpose and expected duration for participation was given to each participating nurse. Sufficient time to examine the consent form and ask any questions regarding the study was provided. Nurses were assured of the confidentiality and they were informed that participation is voluntary and they can drop out of study at anytime without loss

CHAPTER FOUR

4.0 Results

Data were collected during May and June 2013 at KCMC Hospital, surgical wards. A total of 47 children with burn injuries, 47 caregivers, and 23 nurses participated in the study.

Results are presented in five sections:

Section A: Social-demographic characteristics of children
Section B: Circumstances of burn injuries

Section C: The level of pain experienced by under-ten children with burn injuries

Section D: Comparison of the child's pain measurement with the nurse's and the caregiver's perception of their pain.

Section E: Methods used in the assessment and treatment of pain in children with burn injuries

Section A: Social-demographic characteristics of children

The socio-demographic characteristics of children included age, sex, place of residence and caretaker of the child. Though socio-demographic information was not central to the study, personal information helped to contextualize the findings and it help in the formulation of health related burn prevention programs in order to enhance health, safety and security of children.

Table 1. Socio-demographic characteristics of children under 10 years admitted to KCMC, Tz with burns, May-June, 2013.

Variables	Frequency	Per cent
Age (Years)		
<1	6	12.76
1-2	20	42.54
3-4	10	21.3
5-6	3	6.4
7-8	5	10.6
9-10	3	6.4
Sex		
Male	30	63.8
Female	17	36.2
Place of residence		
Rural	40	85.1
Urban	7	14.9
Caretaker		
Mother	35	74.5
Father	6	12.8
Guardian	6	12.8

The results show that the children's age groups mostly affected with burn injuries were 1-2 years 20(42.54%), 3-4 years 10(21.3%) and 0-1 years 6(12.76%) years. Most of them 30(63.8%) were males. A vast majority 40(85.1%) were from rural areas where as 7(14.9%) were from urban areas. Regarding child's caretaker most children 35(74.5%) were being taken care of by their mothers in the hospital, and 6(12.8%) by their fathers. Only 6(12.8%) were being taken care of by a guardian.

Section B: Circumstances of burn

Table 2. Characteristics of burns of children less than 10 years at KCMC, TZ, May - June 2013

Variable	Frequency	Per cent
Motive to burn		
Non-intentional	47	100.0
Cause of burn		
Scald	33	70.2
Flame	14	29.8
Total body surface area burned		
Burn between 10% and 20%	29	61.7
Burn above 20%	18	38.3
Depth of burn injury		
Deep burns	31	66.0
Full thickness burn	14	29.7
Superficial burns	2	4.3
Burn occurred		
At home	47	100.0
Where burn occurred specifically		
Kitchen	33	70.2
Bed room	10	21.3
Sitting room	4	8.5

All children's burns were non-intentional; they occurred accidentally. All burn injuries in these children occurred at home mostly 33(70.2%) in the kitchen. Other burns 10(21.3%) occurred in the bedroom and 4(8.2%) in the sitting room. Regarding the cause of burn, scald was the most common cause of burns in 33(70.2%) of the children. Regarding Total Body Surface Area (TBSA) burned, moderate burns i.e. burns between 10% and 20% constituted 29(61.7%) and major burns i.e. burns above 20% constituted 18(38.3). Regarding depth of burn most 31(66.0) were deep burns, 14(29.8) were full thickness burns and 2(4.3%) were superficial burns

Agent of burn

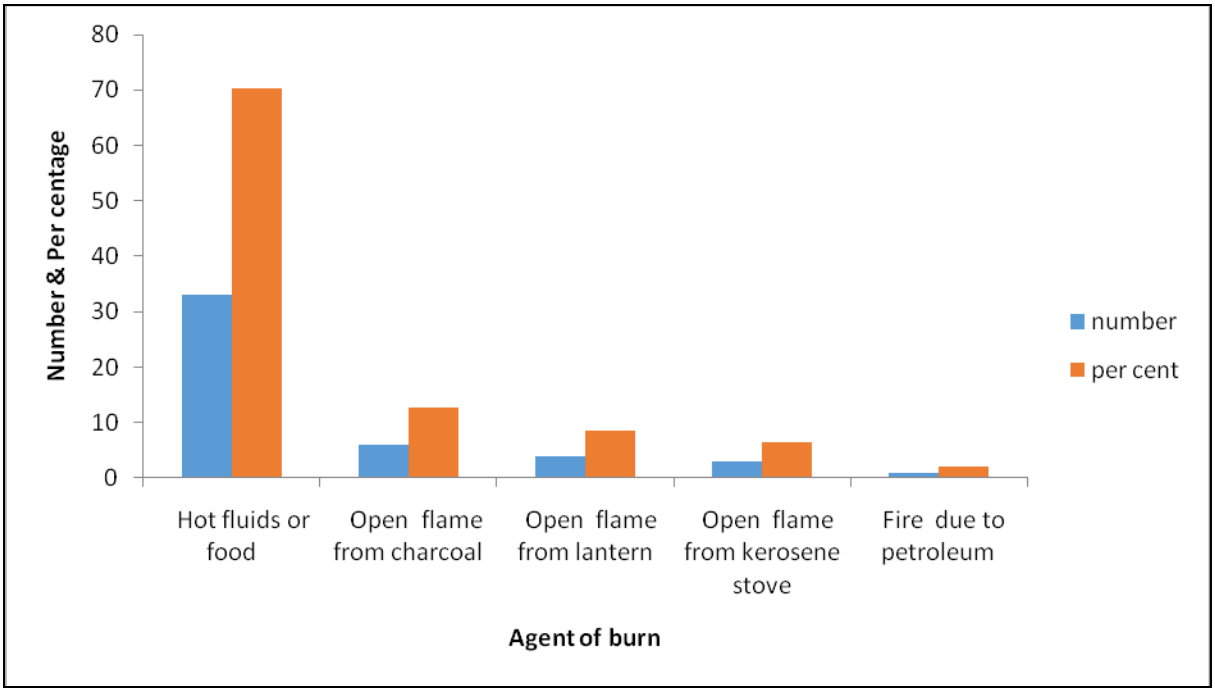


Figure 1. Agent of burn of children under ten years at KCMC, Tanzania, May-June 2013

The most common agent of burn in these children 33(70.2%) were hot fluid or food. Other agents were open flame from charcoal 6(12.8%), Open flame from lantern 4(8.5%), open flame from kerosene stove 3(6.4%) and fire due to petroleum 1(2.1%). About 42(89.4%) of burns were due to cooking overall

Anatomical body area burned.

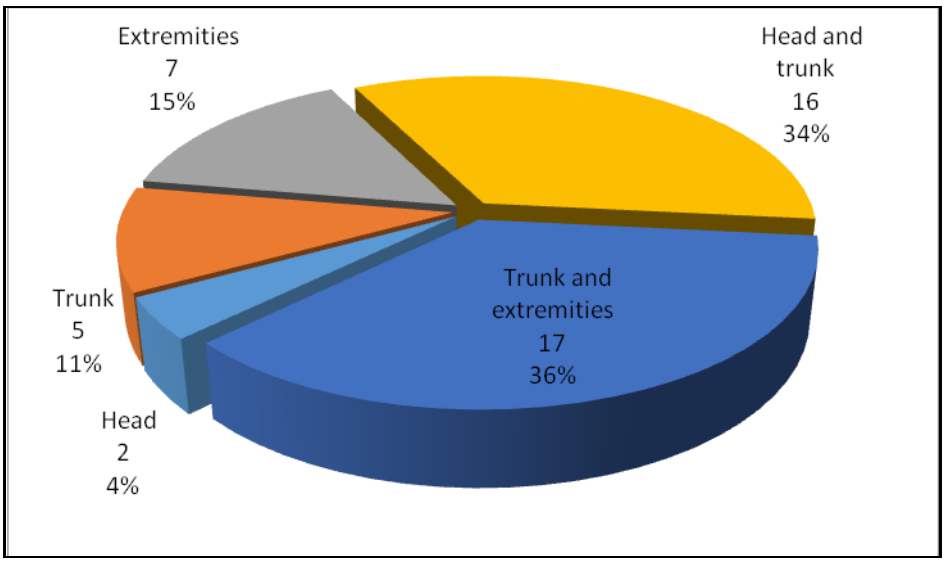


Figure 2. Main anatomical body area burned on children under ten years at KCMC, Tanzania, May-June 2013

Most burn injuries involved more than one anatomical area where 17(36%) involved trunk and extremities and 16(34%) involved head and trunk. Burns which involved extremities only occurred in 7(15%) of children, trunk only in 5(11%) and head only in 2(4%)

Treatment of burn

Table 3. Pre-hospital and hospital treatment of children under 10 years admitted to KCMC, Tz with burns, May-June, 2013.

Time taken for a child to present in hospital		
Within 24 hours	47	100.0
Pre-hospital first aid		
Application of honey	10	21.3
Uncooked egg	10	21.3
Washing with water	8	17.0
Maize flour	6	12.8
None	5	10.6
Smearing with Vaseline	4	8.5
Mud	3	6.4
Cow milk	1	2.1
Hospital procedures		
Wound dressing	45	95.7
Debridement	1	2.1
Debridement and dressing	1	2.1

All children in the study were taken to hospital within 24 hours after sustaining the burn injury. A vast majority had local agents applied on the wound as a first aid treatment provided by parents or caretakers at home. The most common agents applied on the burn wound as a first aid management were honey 10(21.3%), uncooked egg 10(21.3%) and water 8(17.0%). Other agents applied on the wound were maize flour 6(12.8%), Vaseline 4(8.5%), mud 3(6.4%), and cow milk 1(2.1%). However, 5(10.6%) of children had nothing applied on their burn wound. The most common kind of treatment procedure performed to children in hospital was wound dressing 45(95.7%)

Section C: The level of pain experienced by under-ten children with burn injuries

Pain was assessed in children less than 6 years old by using FLACC scale and children above 6 years VAS was used. Both tools were successful in assessing the level of pain the child was experiencing in a scale of 0 to 10.

Table 4. Pain score according to the severity of pain of children under 10 years admitted to KCMC, Tz with burns, May-June, 2013.

Pain Score	**Severity**	**Frequency**	**Percentage**
0	No pain	0	0
1 – 2	Slight pain	0	0
3 – 4	Annoying pain	0	0
5 – 6	Significant pain	3	6.38
7 – 8	Severe pain	15	31.91
9 – 10	Worst pain	29	61.70
Total		**47**	**100.0**

Pain score in children ranged from 5 to 10 (mean = 8.83; SD 1.324). Most children 29(61.70%) were in worst pain during wound dressing. Severe pain was measured in 15(31.91%) of children and 3(6.38%) had significant pain

Table 5. Comparison of mean pain score with depth of burn of children under 10 years admitted to KCMC, Tz with burns, May-June, 2013.

Depth of burn injury	Frequency	children pain score			
		mean	std. dev.		
Superficial	2	7.00	1.00		
Deep	31	9.00	1.00		
Full thickness	14	9.00	2.00		
Total	47	9.00	1.00		
ANALYSIS OF VARIANCE					
Source	SS	Df	MS		
Between Groups	7.78	2	3.86		
Within Groups	72.86	44	1.66	F	P-value
Total	80.64	46	1.75	2.35	0.11

From table 5 above the results shows that there was no significant difference in mean pain among children who got superficial, deep and full thickness burn showing F-test of 2.35 and p-value 0.11.

Table 6. Comparison of the mean pain scores according to the TBSA burned of children under 10 years admitted to KCMC, Tz with burns, May-June, 2013.

Variable	Total	Mean(SD)	95% CI	Differences in mean (t-test)		
				Mean	95% CI	P-value
TBSA burned						
10%-20% TBSA	29	8.93(0.24)	[8.44-9.42]	0.26	[-0.54,-1.07]	0.51
Above 20% TBSA	18	8.67(0.33)	[7.96-9.67]			

There is no significant difference between the mean pain scores of children with moderate burns (10%-20%TBSA) and those with severe burns (Above 20% TBSA) (t=0.6613; SD=1.324, df=45, p=0.51 by independent samples t-test).

Section D: Comparison of the child's pain measurement with the nurse's and the caregiver's perception of pain of children under 10 years admitted to KCMC, Tz with burns, May-June 2013.

Table 7. Comparison of the mean pain scores of caretakers and nurses and pain score of children under 10 years admitted to KCMC, Tz with burns, May-June, 2013.

Variable	Total	Mean(SD)	95% CI	Differences in mean (t-test)		
				Mean	95% CI	P-value
Pain score						
Children's pain score	47	8.83(1.32)	[8.44-9.22]	0.09	[-0.57;0.74]	0.8
Care takers' pain score	47	8.74(0.27)	[8.20-9.29]			
Pain score						
Children's pain score	47	8.83(1.32)	[8.44-9.22]	1.49	[0.82;2.16]	<0.001
Nurses' pain score	47	7.34(1.91)	[6.78-7.90]			

There was no significant difference between the mean pain score of children and caretaker (t=0.257; SD=1.599; df=92; p=0.8 by independent samples t-test). The 95% confidence interval for the mean difference between children and caretakers is (–0.57; 0.74), with the best estimate of 0.09 scores higher. Therefore, caretakers understood the child's pain. The highly significant difference in pain score was observed between children and nurses (t=4.387; SD=1.799; df=92; p<0.0018 by independent samples t-test). The 95% confidence interval for the mean difference between children and caretakers was (0.82; 2.16), with the best estimate of 1.49 scores higher. The nurses believed that the children were feeling significantly less pain than the children or caregivers believed.

Section E: Methods used in the assessment and treatment of pain in children with burn injuries

This section presents analysis of data from nurses. Twenty three (23) nurses accepted to be interviewed. Ten nurses refused to be interviewed because they were too busy providing nursing care to patients.

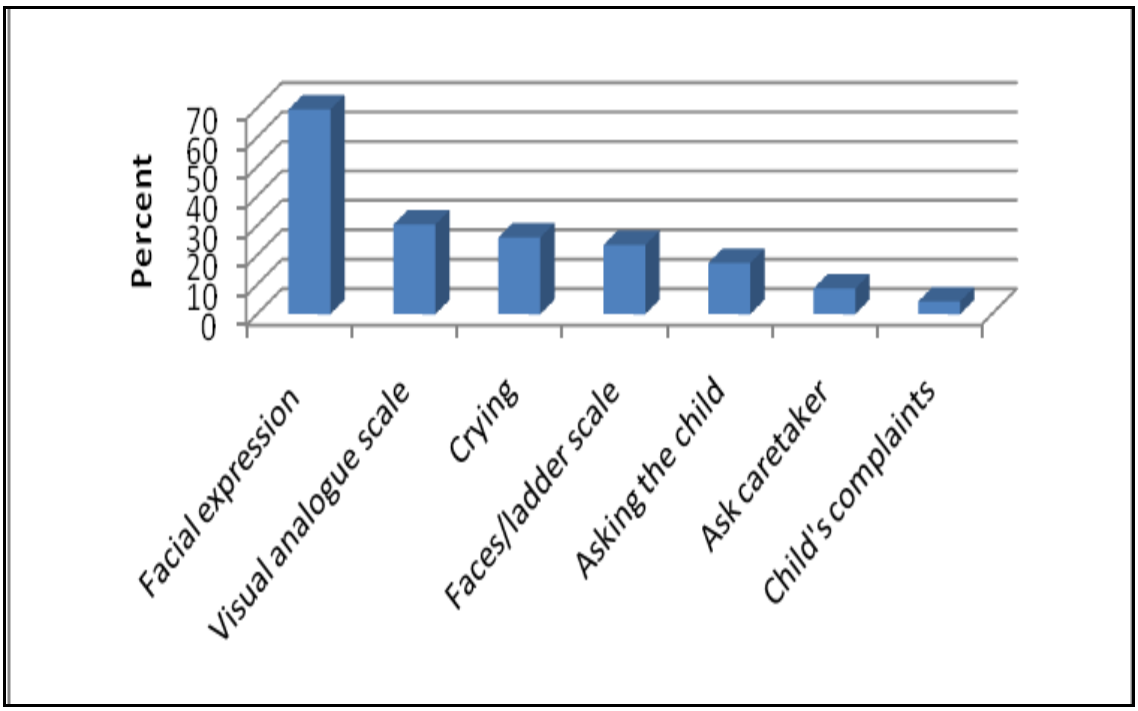


Figure 3. Methods used by nurses to assess pain in burnt children (n=23 nurses)

When nurses were asked about which method they use to assess pain in children with burn injuries in their ward, the result showed that there was no standard and common method used by nurses to assess pain. Majority 16(69.57%) looked to the facial expression of the child, 10(23.48%) used Faces/ladder scale, 7(30.43%) used VAS, 6(26.09%) used the child's cries, 4(17.39%) asked the child if he/she feels pain, 2(8.69%) asked the caretaker if the child is feeling pain and 1(4.35%)listened to the child's complaints.

Section F: Nurse's satisfaction with pain relief in children with burn injuries

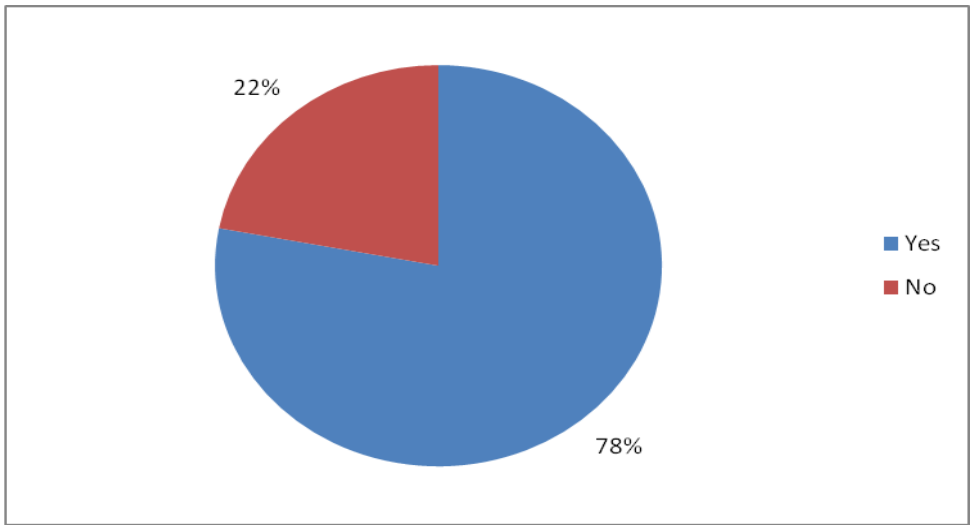


Figure 4. Satisfaction with pain relief in burnt children among nurses (n=23)

When nurses were asked if they are satisfied with pain relief in children with burn injuries, majority of nurses 18(78%) were satisfied with pain relief and 5(22%) were not.

When nurses were asked about the pharmacological methods used to treat child's pain, all of them said drugs administered orally and by injection were the main methods used to relief child's pain in their wards. Regarding non-pharmacological methods used to relief pain in children with burn 16(69.57%) said that non-pharmacological methods are not used in their wards to relieve pain in children with burn injuries. However, sometimes non-pharmacological methods were used such as reassurance were used by 6(26%) of the nurses, massage 3(13%), giving toys 2(9%), and 2(9%) of nurses thought that adequate soaking of dressings during wound dressing is one of the non-pharmacological method to relief pain in burned children.

Table 8. Factors hindering pain relief of children under 10 years admitted to KCMC, Tz with burns, May-June, 2013.

Responses	Frequency	Percentage
Shortage of analgesics	13	56.52%
Shortage of nursing staff	12	52.17%
Poor or no pain assessment by nurses	12	52.17%
Lack of burn unit	11	47.83%
Congestion of the ward with patients	8	34.78%
Lack of knowledge on pain relief among nurses	7	30.43%
Poor working environment	6	26.09%
Lack of cooperation from the child during dressing	3	13.04%

Nurses were asked to give their views about what factors they think are hindering pain relief in burnt children at their working place. The main factors mentioned by nurses that hinder adequate pain relief were shortage of analgesics 13(56.52%), Shortage of nursing staff 12(52.17%), poor or no pain assessment by nurses 12(52.17%) and lack of burn unit 11(47.83%). Other factors were congestion of the wards with patients, lack of knowledge on pain relief among nurses, poor working environment and lack of cooperation from the child during dressing

Table 9. Suggestions from nurses about how to achieve adequate pain relief of children under 10 years admitted to KCMC, Tz with burns, May-June, 2013.

Responses	Frequency	Percentage
To increase nurses knowledge on pain relief in children	14	60.89%
To have burn unit	12	52.17%
To have adequate nursing staff	11	47.83%
To have adequate analgesics of various types	10	43.48%
To use multidisciplinary approach in pain relief	4	17.39%
To combine drugs with non-pharmacological methods	4	17.39%
Proper pain assessment in children	2	8.69%

When nurses were asked to give their suggestions on how to improve burn care for children the responses were to increase nurses knowledge on pain relief in children said by 14(60.89%) of nurses, the hospital to have burn unit 12(52.17%), to have adequate nursing staff 11(47.83%) and to have adequate analgesics of various types 10(43.48%). Other suggestions given by nurses to improve pain relief are to use multidisciplinary approach in pain relief, to combine pharmacological and non-pharmacological methods of pain relief and to do proper assessment of pain in children

CHAPTER FIVE

5.0 Discussion

5.1 Socio-demographic characteristics of children

According to Leininger's Sunrise Model, the domain of inquiry was the assessment of pain management in under-ten year old children with burn injuries admitted in the hospital. Discussion of the findings was done according to the Leininger's definitions of nursing care and Leiningers professional care-cure and Generic questions (Leininger and McFarland, 2002).

Childhood burn injury is common. There are many factors which put a child at particular risk of burn injuries including age. The majority of children in the current study were toddlers and infants within the age groups 1-2 years 20(42.54%), 3-4 years 10(21.3%) and 0-1 years 6(12.76%). This indicates that most burn injured children were under four years old. This finding is consistent with that found in a study conducted in Bugando Medical Centre in Northern Tanzania by Chalya et al., (2011) who found that children aged 2 years and below was the majority and accounted for 45.9% of cases of burns. This age group has also been reported in a study done in Turkey to be the most vulnerable to burn injuries (Balseven-Odabas A., Tümer A.R., Keten A., &, Yorganc K. 2009). This finding highlights the nature of low and middle income countries like Tanzania where there are few efforts in the prevention and care of burn injuries compared to high-income countries (Ekvall, 2010)

These age groups i.e. infants and young children are at greater risk of scalds from hot fluids and burns from house fires. This may be due to the fact that infants and young children are so playful and they play around hot foods and drinks as a result they get burned. Therefore, it is important to provide children with safe homes through educating parents and caregivers in recognizing and addressing risks for burns and reinforcing the importance of their role to ensure safety of their child. Caretakers should be educated about the importance of close supervision of their children when they are near fire.

In this study males 30(63.8%) were more affected than females 17(36.2%) which is in agreement with other studies conducted in Tanzania, United Kingdom (UK) and a systematic review in the East Mediterranean region (Chalya et al., 2011; Watson & Mulvaney, 2010; and Othman & Kendrick 2010). The reason for male predominance may be due to the fact that male babies naturally are overactive as compared to the female babies. Also this may indicate that male babies are at greater risk due to their curiosity in playing with fire and access to smoker's materials. Female children's risk may be due to their participation in cooking, possibly on open fires which increase their risk of burn injuries.

Majority 40(85.1%) of children with burn injuries were from rural areas where as 7(14.9%) were from urban areas. The reason may be due to the fact that in rural areas there are agricultural areas with a lot of rubbish which needs to be burned. In rural areas probably, parents and guardians are busy with agricultural and pastoralist activities leaving their children at home with younger brothers and sisters. Also in rural areas there are more poor people who live in and houses with unsafe nature of heating, lighting and cooking such as unsafe use of kerosene stove, candles and lantern for lighting which put children in this population at risk of burn injuries when they are around. This indicates the need for preventive measures to be put in place which could address better home design and by educating parents and caretakers about safe environments and child supervision

Regarding child's caretaker, most children 35(74.5%) were being taken care of by their mothers in the hospital, and 6(12.8%) by their fathers and 6(12.8%) were being taken care of by a guardian. This is due to the fact that it is a common observed phenomenon in African cultural context that women lookafter children, they are the main caretakers of children at home and men are breadwinners who should go out of home to search for money and food. It is normal that some children with burns are cared for by their parents, few by aunties, siblings, uncles etc.

5.2 Circumstances of burn

All children's burns in the current study were non-intentional; they occurred accidentally. This finding contradicts slightly with the finding by Chalya et al., (2011) in Northern Tanzania who found that about 2.9% of burn injuries were intentional mainly due to child abuse. This difference may be due to small sample size of the current study. A review of burns in Tanzania by Outwater, Ismail, Mgalilwa, Temu & Mbembati, (2013) revealed that a 1971-1974 study based on admissions to Muhimbili National Hospital (MNH) in DSM found that most childhood burns were due to accidental falls into fires and scalds from boiling water.

Overcrowding with inadequate cooking facilities are important contributory factors to childhood burns. All burn injuries in this study occurred at home mostly 33(70.2%) in the kitchen which is in agreement with other studies done elsewhere (Chalya et al., 2011; Othman & Kendrick, 2010; Outwater et al., 2013). Home environment remains to be a dangerous place for children due to lack of enough space for children to play, lack of separate cooking room, improper handling of hot foods and fluids like water, porridge and tea, poor infrastructure and architectural like living in a single room which put children at risk of burn injuries due to their easy reach of hot staff. Therefore, some work needs to be done to reduce high density at homes by building well designed houses, with provision of playground for children. This can be achieved by individual, family and community sensitization and possibly by putting in place a house building policy which favors well designed houses, with provision of playground for children.

Scald injuries are frequently caused by hot coffee, tea, soup, milk, porridge and hot water (Balseven-Odabas A., et al., 2009). In the current study scald was the most common cause of burns in 33(70.2%) of the children caused by various kinds of hot liquids. The same observations have been reported in studies done in the country and other countries (Chalya et al., 2011; Mbembati et al., 1999; Sarungi & Kaduri, 1980; Outwater et al., 2013;). These injuries may be due to densely populated houses and families, poor houses with no cooking

area, child neglect, poor child supervision and children climbing trying to reach things. Hot water for ugali, tea, porridge was the most important agents where it poured on the child's body and cause burn injury.

Also, these injuries may be contributed to by cooking on low placed stoves and eating breakfast while seated on the floor in rural areas (Balseven-Odabas., et al., 2009). Many of the burns due to scalds described in this study could have been prevented if hot water containers especially the one prepared for ugali, porridge, or kerosene stoves and lantern are placed at higher levels or out of reach of children. Burns especially caused by hot water are preventable. Children should not be allowed in the kitchen when their mothers or caretaker are cooking. Also crawling children should not be left unattended since they are specially at risk of burns

Flames were the second most common cause of burns. Burns from charcoal 6(12.8%), Open flame from lantern 4(8.5%), open flame from kerosene stove 3(6.4%) and fire due to petroleum 1(2.1%). This is mostly due to ignition of flammable liquids such as kerosene, petrol and matches. Therefore, sales and handling of flammable liquids to children must be prohibited. It is also important to have written legislations that force manufacturers or sellers of these liquids to improve safety measures and not sell or handle it to children. Labeling of flammable liquids warns people about their dangers and flammable liquids should be stored properly away from reach of children. The mechanism of burn is that child's clothes catch fire from burning charcoal, kerosene stoves, candle or any other source of open fire

It is of concern that trunk and extremities burns were amongst the most common areas burnt in this manner. Head and trunk including face was the second most common areas burned. This kind of burn could result in short and long term functional and psychological impairment, and many will require cosmetic surgery to improve scarring even if the burn itself has not caused any loss of function.

The Total Body Surface Area (TBSA) burned, most children 29 (61.7%) had moderate burns (burns between 10% and 20%). Major burns (burns above 20%) affected 18(38.3) of children. This is supported by Chalya et al., (2011). Of children in Mwanza, 31(66.0) had deep burns, 14(29.8) were full thickness burns and 2(4.3%) were superficial burns. This finding contradicts with the finding by Chalya et al (2011) who found that majority of patients 164 (48.0%) sustained superficial burns only. The remaining patients had either deep burn 98(28.7%) or mixed burns 80(23.4%). This is due to the fact that KCMC hospital is a consultant hospital admitting moderate and major burns only. Minor burns i.e. burn with TBSA less than 10% are admitted in district and regional hospitals.

The only Generic (Folk) care question according to Leininger and McFarland, (2002) used in this study was: What pre-hospital care was employed to relieve the child's pain? A vast majority had local agents applied on the wound as a first aid treatment provided by parents or caretakers at home. The most common agents applied on the burn wound as a first aid management was honey 10(21.3%), uncooked egg 10(21.3%) and water 8(17.0%). Other agents applied on the wound were maize flour, Vaseline, mud, and cow milk. However, 5(10.6%) of children had nothing applied on the burn wound. Application of some local agents on the wound may be a source of infection because these agents are not sterile and may attract or contain variety of microorganisms and infect the wound. Parents and caretakers may apply these local agents on the child's burn wound unaware of the adverse consequences as a first aid management. This indicates the need for health education among parents and caretakers about safe agents to apply as first aid management to prevent infecting the wound with microorganisms

The kind of treatment children were receiving in the hospital was wound dressing 45(95.7%). Children particularly toddlers and infants naturally have less control and that is why they remain under care of adults including parents and caretakers. It is possible that parents and

caretakers were responsible for the burns in these children because of their lack of awareness on preventive measures of burn injuries in children. Therefore, parents and caretakers should be offered training programs to increase their awareness of proper care and close supervision of children

When a child sustains burn injury will require long time admission in hospitals. This causes financial and social burdens to the parents/caretakers, family, society and the nation at large. Preventive strategies at individual, family, community and nation level should be developed to reduce this burden. The most simple and effective way to prevent burn injuries is through public education through broadcasting facilities like posters, radio, television, internet, mobile phones etc. Mass education is also effective and can be offered to parents and caregivers about preventive measures against burns.

5.3 The level of pain experienced by under-ten children with burn injuries

According to Leininger and McFarland, (2002) the level of pain experienced by under-ten children with burn injuries was the first professional care –cure questions. The question was what is the level of pain experienced by under-ten children with burn injuries?

Tissue damage at the burn site is the predominant mechanism of pain and suffering in this cohort of patients. Procedures such as dressing changes and wound care are common, necessary, and painful, requiring sedation and analgesia in pediatric burn patients. These procedures are often performed on a daily basis on the burn ward (Senarath-Yapa & Enock, 2009). In addition children with severe burns are also subjected to more dressing changes, both in frequency and duration, and are also more likely to require operative management. This makes it important for personnel caring children with burn to have appropriate knowledge on pain assessment and management in children in order to alleviate suffering in this cohort of patients. Therefore, pharmacologic treatment with potent opioids, anxiolytics, and other agents (e.g., ketamine) is the first line of therapy

Burn injury is likely to generate unusual high levels of pain (Patterson, 2001). Due to the adverse physiological and emotional effects secondary to pain, adequate pain control is an integral and requisite component in the management of children with burns (Gandhi et al., 2010). However, in the current study most children 29(61.70%) were in worst imaginable during wound dressing. Severe pain was measured in 15(31.91%) of children and 3(6.38%) had significant pain. This finding is congruent to many other studies elsewhere which reported that monitoring and reporting of pain in children with burns has generally been poor (Patterson, 2001; Gandhi et al., 2010). Pain is most often not adequately treated in children with burn injuries probably because of inexperience and unfounded fears of analgesic treatment among medical staff.

Leininger's Theory of Culture Care Diversity and Universality was used to guide the researcher in discovering meanings, patterns, expressions and feelings of pain in children with burn injuries. It was also used to discover experiences and perceptions of caregivers and nurses about their perceptions on the child's pain they are caring for. According to Leininger and McFarland, (2002) pain influence health and wellbeing of cultures. In order to provide appropriate and congruent care nurses caring for these children must understand the cultures surrounding children with burns. There was no difference in the level of pain experienced by children with burn injuries during wound dressing with regard to depth of burn. Children with deep (mean = 9.00; SD = 1.00) and full thickness burns (mean = 9.00; SD = 2.00) experienced more pain than those with superficial burn (mean = 7.00; SD = 1.00) during dressing. However, the observed difference in pain is not statistically significant ($p>0.05$). Normally the depth of burn may be directly related to the extent and severity of burn. This finding may be explained by small sample size of this study due to the fact that children with superficial burns with experience more pain than those with deep and full thickness burns because nerve endings in superficial burn remain intact and exposed and therefore, its stimulation by touch or movement causes pain (Gandhi et al., 2011)

Children with moderate burns (10%-20%TBSA) and severe burns (above 20%TBSA) experienced the same level of pain. This finding may be explained due to the fact that in deep burns some nerves may be completely destroyed and therefore the pain experienced may be less and in full thickness burns all nerve endings have been destroyed and therefore this area should be insensible, which makes children with deep and full thickness burns to have less pain sensation. However, the surrounding areas of both (zones) can be painful which may be is a source of pain experienced by these children (Gandhi et al., (2011). Therefore, it must be understood that all children with burns will experience pain, regardless of the cause, size, or depth of the burn and undertreated pain can result in noncompliance with treatment and, consequently, prolonged healing.

Results shows that there was no significant difference between the mean pain score of children and caretaker ($p=0.8$ by independent samples t-test). This may indicate that parents and caretakers tried to understand the child's experience rather than just acknowledging the pain. This may be due to the fact that parents and other caretakers stay with the child for long time and they want them to recover soon that is why they don't want them to be in pain. Also this may mean that parents exaggerate their child's pain and ask for analgesic drugs before their child needs them. Therefore, there is a need to explore more the interactions between nurses, children and parents in this context in more detail. It is good that the caregivers and the nurses used the same scale which will lead to less bias.

The highly significant difference in pain score was observed between children and nurses ($p<0.0018$ by independent samples t-test). This finding agrees with others who elsewhere who reported that monitoring and reporting of pain in children has generally been poor (Gandhi et al., 2010). The explanation of this finding is that nurses did not understand the child's experience of pain and therefore they under graded the child's pain which may be associated with its under treatment. Nurses may also have a different rating scale based on their experiences treating many people in pain. Undertreated pain can result in noncompliance with treatment and, consequently, prolong healing. Therefore adequate pain control is an important

component in the management of children with burns. Better pain management is enabled by trying to understand the child's experience rather than just acknowledging the pain. Thus the most fruitful approach would seem to be frequent assessment of pain by using standard pain assessment tools

5.4 Methods used in the assessment and treatment of pain in children with burn injuries

The second professional care–cure question was concerned about the methods employed to assess the child's pain (Leininger and McFarland 2002). Pain assessment tools are essential to the diagnosis of underlying burn pain and the effectiveness of their treatment. It should be put as a fifth vital sign which must be taken or measured daily and sometimes more frequently especially in the surgical wards. In the burn patient population, the most common pain assessment tools are verbal self-report instruments that measure pain intensity, such as the "0 to 10" numeric rating scale, VAS and faces/ladder scales. In one of the few studies that examined patient preference burn-injured patients preferred Faces (Summer et al., 2007). In this study the researcher found during pre-testing that the VAS was going to be more easily understood and used visual analogue scale for children from 6 years and above and FLACC scale for children below 6 years successfully.

Better pain management is enabled by trying to understand the child's experience of pain. In order for nurses to better understand the child's pain the most important approach would be frequent assessment of pain by using standard pain assessment tools. During data collection I found Faces/ladder and VAS in the wards where burned children were admitted. But these tools were not always used in pain assessment which made nurses to use un-recommended methods of pain assessment in children. Nurses should be encouraged to use available pain assessment tools for better pain relief in these children.

When nurses were asked about which method they used to assess pain in children with burn injuries in their ward, the result showed that there was no standard and common method used by nurses to assess pain. Majority 16(69.57%) looked to the facial expression of the child, 10(23.48%) used faces/ladder scale, 7(30.43%) used VAS, 6(26.09%) used the child's cries, 4(17.39%) asked the child if he/she feels pain, 2(8.69%) asked the caretaker if the child is feeling pain and 1(4.35%) listened to the child's complaints. It is difficult to tell about pain the level of pain of an individual by just looking at the face because pain is subjective

This finding may mean that nurses are not sure of the tools they need to use in assessing the pain in children with burn at their work place. There is a need for Ministry of Health and Social Welfare generally and KCMC specifically to develop or recommend safe and reliable tools which nurses, doctors and other health care professionals can use to asses pain in children Furthermore, there is a need for surgical department at KCMC hospital to introduce standard tools in the surgical wards which are acceptable to nurses and children for accessing the child's pain. This can reduce confusion among nurses and children and also reduce underestimation of pain and improve pain management in this group of patients. I would recommend FLCC for children below 6 years, and VAS for children 6 years and above because I used them successfully in assessing the child's pain in this study. However, this contradicts with Summer et al., (2007) who reported that in one of the few studies that examined patient preference, burn-injured children preferred faces and color scales to the more commonly used visual analogue and adjective scales. Further investigation is needed to come up with a reliable tool for use in Tanzanian environment

Health care staff does not always assess pain in children well. Some nurses tend to doubt what patients say about their pain. This may be due to the fact that nurses have low knowledge on pain assessment in children, or because of their wider experience. Nurses should rely on what the patients and caregivers say about the child's pain and not how the patient looks like (Taylor, 2010). Most nurses 14(60.89%) recommended that they need their knowledge on pain

relief in children be increased. Nurses and all other medical staff should be trained about how to apply different tools used for pain management as these tools should be understood by staff and patients. Nursing staff also should teach patients including children about the tools so that they can apply them in assessing their own pain. Nurse tutors should also be knowledgeable about pain assessment methods including the application of the tools so that they teach their nurse students at the school so that they apply them in daily nursing care of patients. Pain management including its assessment and treatment should be clearly be placed in nursing curriculums in all levels of nursing carders. On job training as a continuing education programs should be initiated at working places to teach nurses and other medical staff on how to use various modern tools for pain assessment in children

5.5 Methods used to treat pain

This study used Leininger's Sunrise Model to identify methods used to relieve the child's pain. The study followed the third professional care-cure question in the theoretical model which inquired about the methods used to relieve the child's pain (Pharmacological and non-pharmacological)? (Leininger and McFarland 2002). Pain is a subjective personal experience (Taylor, 2010). Hence health care providers need to follow a child centered or individual approach in their assessment and management of pain and painful procedures. This approach promotes the right of the child and family to be fully involved in the treatment procedure, to choose, associate, and communicate.

In the area where this study was done nurses were asked about the pharmacological methods used to treat child's pain, and all of them said drugs administered orally and by injection were the main methods used to relief child's pain in their wards. Paracetamol, pethidine, tramadol and diclofenac were the major drugs used. Which pharmacological agents to be used for procedural analgesia depends with the institutional capability to provide adequate monitoring (pulse oximetry, independent patient observer) because some of the more potent opioids such

as fentanyl and agents like ketamine may provide levels of sedation beyond that of mere analgesia (Srouji et al., 2010). Therefore, the use of potent opioids and anxiolytics should only occur in settings with adequate monitoring, personnel, and resuscitation equipments. However, for wound dressing and debridement procedures in children opioid analgesia with minimal sedation is sufficient and no special monitoring is required

At KCMC where this study was conducted, Ketamine, Fentanyl and Pethidine were used for children with burns admitted in Intensive Care Unit (ICU) to treat pain during wound dressing and debridement procedures where as in the ordinary ward Paracetamol, Diclofenac and Tramadol were commonly used for the same reasons. This is due to scarcity of monitoring facilities and personnel including shortage of nursing staff, lack of effective equipments for resuscitation and drugs. Lack of resuscitation facilities cause doctors and nurses to avoid giving opioids to these children during procedures such as dressing changes and debridement. This causes children to be given less powerful analgesics which make them continue to be in high levels of pain. The hospital management should ensure availability of adequate and proper resuscitation equipments and adequate number of monitoring nurses. Currently, there is shortage of nurses in the entire country which may make recruiting adequate number of nurses impossible. However, nursing schools should increase number of nursing students to be enrolled to reduce this problem of scarcity of nurses.

The sedation phenomenon is subjective, and requires individual and institutional interpretation to ensure safety and practicability in meeting proposed monitoring guidelines for sedation (Srouji et al., 2010). In the area where this study was done there is no existing guideline for management of pain in children with burn injuries. This may cause nurses not to assess pain and its under-treatment. For proper pain management there must be existing guideline and policy. Therefore, the surgical department should develop a guideline for pain management to be used by all staff in the unit for common understanding and proper pain management.

Nurses should give adequate analgesics before procedures of wound dressing and debridement. Opioids are the cornerstone of burn pain control (Mustard and Richardson 2009). However, it is important for nurses to have regular and ongoing pain assessment to guide analgesic regime to cope with the evolving nature of burn pain and its response to medication. Before giving analgesic drugs nurses must have an understanding of the altered pharmacokinetics state.

Regarding non-pharmacological methods used to relief pain in children with burn 16(69.57%) said that no non-pharmacological methods are not used in their wards to relieve pain in children with burn injuries. However, sometimes non-pharmacological methods were used such as reassurance were used by 6(26%) of the nurses, massage 3(13%), giving toys 2(9%), and 2(9%) of nurses thought that adequate soaking of dressings during wound dressing is one of the non-pharmacological method to relief pain in burned children. This means that may be nurses do not know how to administer non-pharmacological methods of pain relief or they have no chance to do so because of they're being busy.

Distraction is the most frequent intervention used to guide children's attention away from the painful stimuli and reduce pain and anxiety (Mustard and Richardson, 2009). It is most effective when adapted to the developmental level of the child. Distraction techniques can be provided by nurses, parents or child life or other paramedical professionals. Sroujit et al (2010) reported that distraction can lead to the reduction in procedure times, and the number of staff required for the procedure.

Therefore, nurses should have adequate knowledge about various non-pharmacological methods of pain relief in children according to the child's age importantly destruction methods. This can be through on-job training using seminars or workshops. Also all nursing curriculums in the country should contain a thorough teaching package of non-pharmacological methods so that nurse students have this knowledge and skills when they

graduate. Nurses should teach parents or caretakers taught about various methods of non-pharmacological methods of pain relief so that they can apply them even in the absence of the nurse.

At the area where this study was done the use of non-pharmacological methods was not encouraging. However, nurses were trying to use some non-pharmacological methods with limited resources including reassurance, massage, giving toys and by adequate wound soaking to comfort the child. Other non-pharmacological methods which can be used by nurses are cognitive interventions (imagery, education/information, and coping), and behavioural methods (nutritive sucking, skin to skin contact, rocking and holding the child and swaddling the infant) (Sroujit et al., 2010). I encourage development of pain relief guideline on non-pharmacological methods which can be applied in all settings mainly in consultant hospitals where patients with major burns are admitted.

Due to adverse physiological and emotional effects due to burn, adequate pain control is important part in the management of children with burns. In this study the use of multidisciplinary approach in pain relief and to combine pharmacological and non-pharmacological methods of pain relief was recommended by nurses to be a better and aggressive pain relief approach. This was also reported by Gandhi et al., (2010) that a multidisciplinary approach is necessary to achieve a robust pain relief. A multidisciplinary team for pain relief may include nurses, doctors, anesthetists, physiotherapists, occupational therapists, psychologists, spiritual leader, family member and others. A multidisciplinary team will discuss together and agree on the better assessment and treatment of pain on the child. I recommend initiation of multidisciplinary approach for pain relief for these children

5.6 Satisfaction with pain relief

Although nurses rated children's pain high (mean=7.34 SD=1.91) majority 18(78%) were satisfied with pain relief. This may mean that nurses see pain in children as normal symptom which they should experience during wound dressing. Since nurses were satisfied with pain relief it means that they cannot take initiative to try reducing the child's pain. This attitude makes many children to remain in severe unrelieved pain.

5.7 Factors hindering pain relieve

Nurses were asked to give their views about what factors they think are hindering pain relief in burnt children at their working place. Respondents identified a number of barriers which were related to staff, children, and organization. The main factors were shortage of analgesics 13(56.52%), shortage of nursing staff 12(52.17%), poor or no pain assessment by nurses 12(52.17%) and lack of burn unit 11(47.83%). Other factors were congestion of the wards with patients, lack of knowledge on pain relief among nurses, poor working environment and lack of cooperation from the child during dressing. This finding concurs with a study done in London by Twyross, (2011) who found that barriers to effective pain relief were related to the staff, children and parents and the organization. In his study Twycross found that staff shortages and a heavy workload detracted from the quality of the care they could provide. Several participants indicated that insufficient analgesic drugs were sometimes prescribed.

Therefore, nurses should take an active role as they could do in managing child's pain rather seeing it as the parents and child's responsibility to let them know when they are experiencing pain. They should always assess patient pain by using a chosen tool. Also nurses should listen to what the child said about pain and also listening to the parents or caretaker because they seem to understand the child's pain. Nurses should ensure that the hospital has adequate and effective analgesics of various kinds. Also recruitment of more nurses to adjust the number of nurses to that of patients in surgical wards may reduce the problem.

When nurses were asked to give their own suggestions on how to improve burn care for children with burn injuries at their working place and the responses were to increase nurse's knowledge on pain relief in children, the hospital to have burn unit, to have adequate nursing staff, and to have adequate analgesics of various types. Other suggestions given by nurses to improve pain relief are to use multidisciplinary approach in pain relief, to combine pharmacological and non-pharmacological methods of pain relief and to do proper assessment of pain in children

5.8 Study limitations

The sample size for children in this study was expected to be 209 participants. However the study ended up with 47 participants. The small sample size in this study makes low power of the study and hence biased due to less external validity for the whole study

The number of nurses who were estimated in the study was the same to number of children in the study. However due to difficulty in getting participants the number of children obtained were 47 and hence it was expected that same number of nurses would participate. Due to the fact that some nurses were found more than once caring for these children they were counted once

The study reports on children admitted for burns to one tertiary hospital therefore, may not truly be representative for the general population. However, the researcher included all children who were admitted during the entire period of data collection, therefore the number of severely burned children in the catchment area not included in this study is estimated to be small.

This study did not capture information on children with burns less than 10% TBSA because smaller burns was not a criteria for admission to the hospital where this study was done

The limited geographical uptake area and the subsequent composition of the participants may affect the generalization of findings of this study. Though KCMC is the main hospital providing care to children with burn injuries several other hospitals in Kilimanjaro region also provide this service to a substantial number of children, thus may not be generalizable to the entire region but may be representable for prognosis of these children at KCMC

Lastly the data was collected during a two months period. It is possible that the information obtained could be specific to the period data was collected.

CHAPTER SIX

6.0 Conclusion and recommendations

6.1 Conclusion

Most children under ten years with burn injuries admitted to KCMC hospital were males and most of them were aged between 0 to 4 years. The main cause of burn was scald mostly from hot liquids or foods. Most of them occurred at home mainly in the kitchen. Majority of children had local agents applied on the wound as a first aid treatment provided by parents or caretakers at home which put them in danger of acquiring infection.

Most children were in worst and severe pain during wound dressing and debridement. Nurses underscored the child's pain differently from caretakers who had the same score as their children. Therefore, burn injuries could be prevented by encouraging child supervision, improving the home environment, and living conditions and through educating parents and caretakers. Better pain management can be achieved trying to understand the child's experience of pain. Thus the most fruitful approach would seem to be frequent assessment of pain by using standard pain assessment tools and by increasing nurse's knowledge on pain assessment and treatment in children. Nurses need to improve communication with caregivers who have been shown to understand the child's pain. Therefore nurses can ask the caregivers about the child's pain and expect to get an answer that corresponds significantly to what the child is feeling.

6.2 Plan for utilization and dissemination of results

Plan for utilization

This research was expected to produce useful information which can be used by health care providers and institutions as a basis for improvement of care for children with burn injuries especially on the aspect of pain management including its assessment and treatment. It is a sincere hope of the researcher that findings also will be there for the purpose of being used as the baseline data for further interventions and research activities. The researcher will use the research findings as evidence base in teaching nursing students about pain assessment and management in children with burn injuries including the best and appropriate pain assessment tools

Plan for dissemination

The research findings are expected to be disseminated to Muhimbili University of Health and Allied Schools (MUHAS), Tumaini University KCM College found at the area where this study will be conducted, KCMC Hospital where data was collected, for the purpose of being used as the baseline data for further interventions and research activities as well as for improving pain management in children with burn injuries. Findings will be presented at various nursing conferences, such as pain conferences. Also it will be written up for publication into various nursing and medical journals.

6.3 Recommendations

Infants and young children are at greater risk of scalds from hot fluids and burns from house fires. Many people say prevention is better than cure and education is power. Therefore, there is a need for more focus on prevention. The most efficient way to prevent burn injuries in children is through provision of education to the parents and caretakers and also to the child about preventive measures of burns. Parents and caretakers should be educated about the importance of providing children with safe home free from burn trough educating parents and caregivers in recognizing and addressing risks for burns and reinforcing the importance of

their role to ensure safety of their children. Caretakers should be educated about the importance of close supervision their children when they are near fireworks. People working at Fire Extinction Department in Kilimanjaro region are very important and potential source of education to parents, caretakers, children and the society at large. They should not only work to put fire off but also they should prevent occurrence of fires and burn injuries to the community through education. Children should be taught by parents, caretakers, teachers and others who are close to them to stay away from hot liquids, lighters and matches. Parents and caretakers should be taught to keep all hot liquids, lighters and ignition materials out of reach of children.

Nurses are very important sources of education. Education can be provided by nurses when they are working in the wards, working at the clinic, or through health promotion programs or campaign for burn prevention

In rural areas there are more poor people who live in and houses with unsafe nature of heating, lighting and cooking such as unsafe use of kerosene stove, candles and lantern for lighting which put children in this population at risk of burn injuries when they are playing around. Preventive measures should be put in place which could address better home design and by educating parents and caretakers about safe environment keeping for children. This can be achieved through educating parents and caretakers about the importance of building good houses with enough space and a separate room for kitchen. Also there is a need to provide individual, family and community sensitization and possibly putting in place a house building policy which favors well designed houses, with provision of playground for children

Burns especially caused by hot liquids are preventable. Children should not be allowed in the kitchen when their mothers or caretaker are cooking. Also crawling children should not be left alone unattended since they are especially at risk of burns. Parents and caregivers should be given an opportunity to express their needs and concerns to the nurse so that proper interventions in prevention burns can be achieved

Application of some local agents on the wound may be a source of infection because these agents are not sterile and may attract or contain variety of microorganisms and infect the wound. Parents and caretakers may apply these local agents on the child's burn wound unaware of the adverse consequences as a first aid management. However, they should be advised about application of safe substances such as honey and application of clean cold water. This indicates the need for health education among parents and caretakers about safe agents to apply to prevent infecting the wound. Teaching parents and caretakers in first aid and burns contra the traditional treatment.

Health care staff does not always assess pain in children well. This may be due to the fact that nurses have low knowledge on pain assessment in children and how to apply pain assessment tools. Assessment tools are essential to the diagnosis of underlying burn pain and the effectiveness of their treatment. Pain assessment must be done or measured daily and sometimes more frequently especially in the surgical wards depending with the condition of the patient. It is important to train nurses on how to apply modern and various kinds of pain assessment tools in children.

Further, investigation or research is recommended to come up with a reliable tool for use for children in Tanzanian environment

Nurses should first of all put focus on communication with the child and the caregiver when they want to understand child's pain. Together with using pain assessment tools, nurses should also ask children and caretakers about the magnitude of pain that the child is suffering from since they showed to understand child's pain better.

Nurse tutors should also be knowledgeable about pain assessment methods including the application of the tools so that they teach their nurse students at the school for them to apply them in daily nursing care of patients. Pain management including its assessment and treatment should be clearly being placed in nursing curriculums in all levels of nursing

carders. On job training as a continuing education programs should be initiated at working places to teach nurses and other medical staff on how to use various modern tools for pain assessment in children stressing the importance of frequent pain assessment

Emphasis is adequate pain relief in children. Pain assessment and treatment guideline is very important because it guides all health professionals about what to do in a certain situation. In the area where this study was done there is no existing guideline for management of pain in children with burn injuries. This may have caused nurses not to assess pain well and its under-treatment. For proper pain management, development of a guideline which addresses all issues about pain assessment and treatment in children. This will prevent confusion among nurses and other health care staff.

However, nursing schools should increase number of nursing students to be enrolled to reduce the problem of scarcity of nurses in order to have adequate number of monitoring nurses.

Results can be exploited in influencing health policy makers to improve burn injury prevention strategies in children and improve pain management in these children when burn occurs. Results can be used in establishing clear policies articulating measures to reduce burn injuries and improve pain management in children with burn and then develop systematic plans with encouraging budget and agreed time lines. Policies should also address availability of pain assessment tools, adequate nursing staffing, availability of burn unit and availability of adequate potent drugs for pain relief in children including facilities for non-pharmacological methods.

Lastly, further research is recommended to be undertaken in various contexts similar to and different from this study. Studies are recommended which incorporate larger and more diverse samples of children with burns and their nurses and caretakers in order to have a wide understanding about this phenomenon

REFERENCES

Albertyn, R., Bickler, S.W., & Rode, H. (2006). Paediatric burn injuries in Sub Saharan Africa: An overview. *Journal of Burns, 32,* 605-612.

Balseven-Odabas A., Tümer A.R., Keten A., &, Yorgancı K. (2009). Burn injuries among children aged up to seven years. The Turkish Journal of Pediatrics, 51, 328-335

Berde, C., & Navil, F. (2002). Analgesics for the treatment of pain in children. *New England Journal of Medicine, 347,* 1094-1103.

Burns, N., & Grove, S. (2001). The practice of nursing research: Conduct, Critique and Utilization. St. Louis: Elsevier Saunders.

Burns, N., & Grove, S. (2005). The practice of nursing research: conduct, critique and utilization. St. Louis: Elsevier Saunders.

Chalya, P., Mabula, J., Dass, R., Giiti, G., Chandika, A., Kanumba E., et al. (2011). Pattern of childhood burn injuries and their management outcome at Bugando Medical Centre in Northwestern Tanzania. *British Medical Journal, 4,* 485-495.

Das, D., Grimmer, K., & Sparnon, A. (2005). The efficacy of playing a virtual reality game in modulating pain for children with acute burn injuries: A randomized controlled trial. *British Medical Journal of Paediatrics, 5,* 1-7.

Durtschi, M., Kohler, T., Finley, A., & Heimbach, D. (2008). Burn injuries in infants and young children. *Journal of Surgery Gynaecology and Obstetrics, 150*(5), 651-656

Ekvall, K. (2010). Nursing care for patients with burns in Tanzania. Available at: htt://urn.kb.se/resolve?urn=urn:nbn:rkh:diva-86. Accessed on 8/10/2012

Forjuoh, S. (2006). Burns in low- and middle –income countries: A review of available literature on descriptive epidemiology, risk factors, treatment and prevention. *Journal of Burns, 32,* 529-537

Gandhi, M., Thomson, C., Lord, T., & Enoch, S. (2010). Management of Pain in Children with Burns. *International Journal of Pediatrics, 2010,* 1-9

Harmers, P., Abu-Saad, H., Hout, A., & Halfens, J. (1998). Are children given insufficient pain relieving medication postoperatively? *Journal of Advanced Nursing, 27*(1), 37-44

Hyder, A., Kashyap, K., Fishman, S., & Wali, S. (2004). Review of childhood burn injuries in Sub-Saharan Africa: a forgotten public health challenge. *Journal of African safety promotion, 2*(2), 43-58.

Kilimanjaro Christian Medical Centre Annual report (2010). Available at: www.kcmc.ac.tz; accessed on 27/3/2013.

Lathan, J., & Rosensen, C. (1991). Oxford: Austen Cornish Publishers Limited.

Leininger, M., & McFarland, M. (2002). Transcultural Nursing: Concepts, theories, research and practice. USA: The McGraw-Hill companies.

Loeser, J. (2001). Bonica's Management of Pain. Philadelphia, PA: Lippincot, Williams & Williams

Massiira-Mukasa, N., & Ombito, B. (2002). Surgical admissions to the Rift Valley Provincial General Hospital, Kenya. *East African Medical Journal, 79*(7), 373-378

Mbanga, F., & Mwafongo, V. (1998). A profile of Burn Injuries in Dar Es Salaam. Tanzania. *Medical Journal 13*(2), 8-12.

Mbembati, N., Museru, L., & Leshabari, M., (1999). Childhood Burn Injuries in Children in Dar es Salaam: Patterns and Perceptions of Prevention. *Journal of African Safety Promotion*, 42-45.

National SAFE KIDS Campaign (NSKC), (2004). Burn Injury Fact Sheet. Washington (DC).

Nicola, A. (2002). Post-operative pain management. *Journal of Pain, 10*(3), 1-7
Nonpharmacological Management. International Journal of Pediatrics Volume 2010, Article ID 474838,(pg1-11)

Oluwatosin, O. (2004). Burns in Africa. *African Journal of Trauma, 2*(1), 20-25

Omar, M., Hegazy, F., & Mokashi, S. (2012). Influences of purposeful activity versus rote exercise on improving pain and hand function in pediatric burn. *Journal of burns, 38*(2), 261-268

Onen, D., & Maicibi, A. (2008). Hertzberg's two factor theory and the motivation of junior non –academic staff at Makerere University. Makerere. *Journals of Higher Education, 1*, 143-152

Othman N and Kendrick D (2010). Epidemiology of burn injuries in the East Mediterranean Region: a systematic review. BMC of public health, 10:83e at: http://www.biomedcentral.com/1471-2458/10/8, Accessed on 3/7/2013

Outwater AH, Ismail H, Mgalilwa L, Temu MJ, Mbembati N, (2013). Burns in Tanzania: morbidity and mortality, causes and risk factors: a review. International Journal of Burn Trauma 2013;3(1):18-29

Parbhoo, A., Louw, Q., & Grimmer-Somers, K. (2010b). Burn prevention programs for children in developing countries require urgent attention: A targeted literature review. *Journal of Burns,* 36(2), 164-175.

Parbhoo, A., Louw, Q., & Grimmer-Somers, K. (2010a). A profile of hospital-admitted paediatric burns patients in South Africa. *Journal of BioMed Central* (BMC), *3*, 165

Patterson, D., Hoflund, H., Espey, K., & Sharar, M. (2000). Pain management. Philadelphia, PA: Lippincot, Williams & Wilkins

Peden, M., Oyegbite, K., Ozanne-Smith, J., Hyder, A., Branche, C., & Rahman, F., et al. (2008). WHO Report on Child Injury Prevention. Burns. Available at: http:/www.firechildren.org, Accessed on 10/10/2012.

Polit, D., & Beck, C. (2006). Nursing research: Principles and Methods. Lippincott: Williams and Wilkins.

Polit, D., & Beck, C. (2008). Nursing research: Generating and assessing Evidence for nursing practice. Lippincott: Williams and Wilkins.

Polit, D., & Hungler, B.P. (1998). Nursing research: principles and methods, Lippincott: Williams and Wilkins, USA

Richardson P, Mustard L. (2009). The management of pain in the burns unit. *Journal of Burns*, 3027, 1-16.

Roman, I., Lewis, E., Kingwangalla, H., & Wilson, M. (2012). Child burn injury in Dar es Salaam, Tanzania: results from a community survey, *East African Journal of Medicine, 19*(2), 135-139.

Sarungi, P., & Kaduri, J. (1980). Childhood injuries in Dar es Salaam, Tanzania. *East African Journal of Medicine, 132*(7), 114-167.

Senarath-Yapa, K, & Enock, S. (2009). Management of burns in the community. *Journal of wounds United Kingdom*, *5*(2), 38-48.

Srouji R, Ratnapalan S, and Schneeweiss S, (2010). Pain in Children: Assessment and

Summer, G., Puntillo, K., Miaskowski, C., Green, P., & Levine, J. (2007). Burn Injury Pain: The Continuing Challenge. *The Journal of Pain*, *8*(7), 533-548.

Temu, M.J., Rimoy, G., Premji, Z., & Matemu, G. (2008). Causes, Magnitude and Management of Burns in Under-fives in District Hospitals in Dare es Salaam, Tanzania. *East African Journal of Public Health, 5*(1), 38-42.

Topcu, R., & Findik, W. (2012). Pain relief connections. *Journal of Pain Management Nursing, 13*(1), 1-63

Torpy, J., Lynm, C. & Glass, R. (2009). Burn injuries. *Journal of the American Medical Association*, *302*(6), 1828.

Twycross A., (2011). Nurses views about the barriers and facilitators to effective management of pediatric pain. Article press. Kingston University, London

Watson MC, Mulvaney CA, (2010). Injury prevention: Burns. *Encyclopedia on Early Childhood Development*. Available at: http://www.child-encyclopedia.com/documents/Watson-MulvaneyANGxp.pdf. Accessed on: 3/7/2013.

WHO, (2012). Violence and injury prevention in children. Available at: www.who.int/violence_injury_prevention/other_injury/burns/enl. Accessed on 7/10/2012.

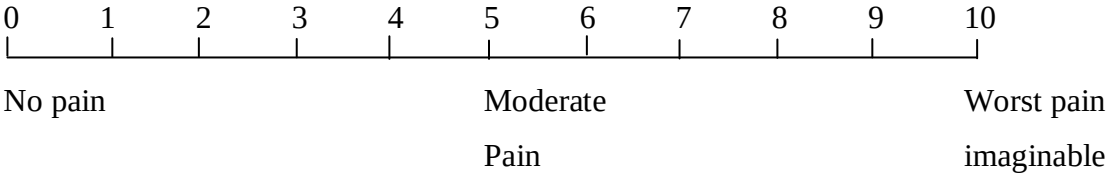
WHO, (2013). Violence and Injuury Prevention. Available at: http://www.who.int/violence_injury_prevention/other_injury/burns/en/index.html, accessed on 4/2/2013

Appendices

Appendix A

Pain assessment tool: Visual Analog Scale

To use the Visual Analog Scale (VAS) the patients are askedto rate their pain on a 0-10 scale in order to determine their level of pain. On the scale 0 = no pain, 1-2 = slight pain, 3-4 =annoying pain, 5-6 = significant pain, 7-8 = severe pain and 9-10 = excruciating pain



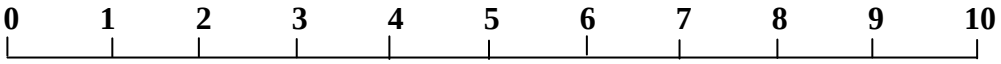
Appendix B

Pain assessment tools (VAS) Swahili version

Kipimo cha maumivu

Kipimo hiki cha maumivu (VAS) mtahiniwa ataelekezwa kupima maumivu yake kati ya 0-10 kuangalia kiwango cha maumivu yao. Kwenye kipimo hiki, 0 = hakuna maumivu, 1-2 = maumivu ni kidogo, 3-4 =maumivu yanasumbua, 5-6 = maumivu ni makali kidogo, 7-8 = maumivu ni makali, na 9-10 = maumivu ni makali sana excruciating pain

KIPIMO CHA MAUMIVU 0 – 10



Hakuna maumivu **Maumivu ya wastani** **Maumivu Makali**

Appendix C

Pain assessment tools:* Face, Legs, Activity, Cry, and Consolability *(FLACC) scale

Whenever possible the child's self-report should be used to assess pain. However, there are situations where this may not be possible, for example, in infants or in those with cognitive impairment or language difficulties. In such instances, the FLACC tool should be used. FLACC is a behavioural assessment tool with five categories where each category scores on a scale of 0–2, which results in an overall score of between 0–10 (Table 10). The child should be observed for 2–5 minutes and their body activity, face, and cry noted according to the scale. If necessary, the health professional should attempt to console the child. The child's pain score should be assessed and recorded at regular intervals, especially before and after analgesia or after nonpharmacological intervention. The FLACC tool has been adequately validated in areas such as paediatric theatre recovery, and oncology and paediatric intensive care units.

Table 10: Paediatric Pain Assessment: FLACC scale Scoring system for infants, young children, cognitively impaired children, anxious children.

DATE/TIME						
Face 0 - No particular expression or smile 1 - Occasional grimace or frown, withdrawn, disinterested 2 - Frequent to constant quivering chin, clenched jaw						
Legs 0 – Normal position or relaxed 1 – Uneasy, restless, tense 2 – Kicking, or legs drawn up						
Activity **0** – Lying quietly, normal position, moves easily **1** – Squirming, shifting back and forth, tense **2** – Arched, rigid or jerking						
Cry **0** – No cry (awake or asleep) **1** – Moans or whimpers; occasional complaint **2** - Crying steadily, screams or sobs, frequent complaints						
Consolability **0** – Content, relaxed **1** – Reassured by occasional touching, hugging or being talked to, distractible **2** – Difficult to console or comfort						
TOTAL SCORE						

Appendix D

Questionnaire; English version

Instructions:

The aim of this questionnaire is to obtain information about pain management in under-ten year old children with burn injuries admitted at KCMC consultant hospital. Questions will be read verbatim by the researcher during a face to face interview. The questionnaire is confidential.

Thank you for your cooperation.

Participant's ID ……..

Part 1: Demographic variables

1. **Age of a child:**

   <1 year ( )

   1 - 2 years ( )

   3 - 4 years ( )

   5 - 6years ( )

   7 -8 years ( )

   9 to 10 years ( )

2. **Sex of a child**

   Male ( ) Female ( )

3. **Place or residence**

   Urban ( )

   Rural ( )

4. Care taker

Mother ( )

Father ( )

Guardian/relative ( )

Others, Please specify ……

5. Motive of burn

Intentional ( )

Non-intentional ( )

6. Causes of burn injury

Scald ( )

Flame ( )

Chemical ( )

Contact ( )

Electrical ( )

7. Agent of injury

Hot fluids or foods ( )

Open flame from charcoal ( )

Open flame from lantern ( )

Open flame from candle ( )

Open flame from Kerosine stove ( )

Others; Please specify ……..

8. Main body area burned

Head ( )

Trunk ( )

Extremities ( )

Genitalia ( )

Others; please specify ……..

9. Total body surface area burned …….. (%)

10. Depth of burn

Superficial ( )

Deep ( )

Full thickness ( )

11. Time taken for a child to present in hospital after an injury

Within 24 hours ( )

After 24 hours ( )

12. Pre-hospital treatment given as a first aid immediately after an injury …..

Traditional preparation ( )

Application of Gentian paint ( )

Application of honey ( )

Washing with salty water ( )

Smearing with oil, butter or petroleum jelly ( )

Antibiotics powder ( )

Others (Mention please)……..

13. Kind of treatment procedures performed in hospital (Choose more than one)

Skin grafting ( )

Debridement ( )

Wound dressing ( )

14. Burn occurred:

At home ( )

Outside home ( )

15. If at home where burns occurred specifically

Kitchen ( )

Sitting room ( )

Bed room ( )

Other area; Please specify ……..

Part 2: INFORMATION ABOUT PAIN

16. Pain score on a scale by the child …….

17. Pain score on a scale by the Caretaker ……..

18. Pain score on a scale by the Nurse ……..

THANK YOU FOR YOUR PARTICIPATION

Appendix E

Questionnaire for caretakers; Swahili version

DODOSO

Maelekezo:

Lengo la Utafiti huu: Utafiti huu utahusu watoto waliolazwa katika wodi/kitengo cha upasuaji hospitali ya rufaa ya KCMC kugundua/kubaini huduma ya maumivu wanayopatiwa watoto wenye majeraha ya moto walio na umri chini ya miaka kumi kwa lengo la kuimarisha huduma hii na kupunguza maumivu kwa watoto nchini Tanzanian

Maswali yatasomwa na kuulizwa na mtafiti. Majibu utakayotoa yatachukuliwa kwa usiri. Thank you for your cooperation.

Utambulisho wa mshiriki ……..

SEHEMU YA 1. TAARRIFA BINAFSI

1. **Umri wa mtot:**
   Miaka <1- 2 ( )
   Miaka 3 - 4 ( )
   Miaka 5 - 6 ( )
   Miaka 7 -8 ( )
   Miaka 9 to 10 ( )
2. **Jinsia ya mtoto**
   Mwanamme ( ) Mwanamke ( )
3. **Mahali mtoto unapoishi**
   Mjini ( )
   Nje ya mji ( )

4. Uhusiano wako na mtoto

Mama ( )

Baba ( )

Mlezi/ndugu ( )

Wengineo; Tafadhali taja ……

SEHEMU YA 2

5. Mazingira/Vishawishi vya ajali

Makusudi ( )

Bila kukusudia ( )

6. Visababishi vya majeraha ya moto

Kimiminika ( )

Moto ( )

Kemikali ( )

Kugusa kitu cha moto ( )

Umeme ( )

7. Aina ya kisababishi

Kimiminika cha moto ( )

Moto unaowaka kutokana na mkaa ( )

Moto unaowaka kutokana na taa/kibatari ( )

mooto unaowaka kutokana na mshumaa ( )

Moto unaowaka kutokana na stovu ya mafuta ya taa ( )

Aina nyingine; Tafathali taja ……..

8. Sehemu ya mwili iliyochomwa/iliyoadhirika zaidi

Kichwa ( )

Kiwiliwili (trunk) ( )

Miguu au mikono ( )

Sehemu za siri ( )

Maeneo mengine; Tafadhali taja ……..

9. Ukubwa wa eneo la ngozi ya mwili iliochomwa …….. (%)

10. Kina cha sehemu ya ngozi iliyochomwa

Juu juu ( )

Kina kirefu ( )

Ngozi yote ( )

11. Muda uliotumika hadi mototo alipofikishwa hospitalini baada ya ajali

Ndani ya masaa 24 ( )

Baada ya masaa 24 ( )

12. Kama ni baada ya masaa 24 ni kwa nini amecheleweshwa kufika hospitali mapema?

……

……..

13. Huduma ya kwanza motto aliyopatiwa mara tu baada ya ajali na kabla hajafikishwa hospitali

Dawa ya kijadi ( )

Alipakwa Gentian ( )

Aliwekewa asali ( )

Kidonda kilioshwa na maji ya chumvi ( )

Kidonda kilipakwa mafuta, mafuta ya siagi au mafuta ya petrol ( )

Aliwekewa ungaunga wa antibiotiki ( )

Vingine (Taja tafadhali)……..

14. Aina ya tiba mtoto anayopatiwa (Chagua jibu zaidi ya moja)

Kurepewa ngozi ( )

Kukwanguliwa kidonda ( )

Kufungwa kidonda ( )

15. Ajali ya kuungua imetokea wapi?

Nyumbani ( )

Nje ya nyumbani ( )

16. Kama ni nyumbani sehemu gani?

Jikoni ( )

Sebuleni ( )

Chumbani ( )

Maeneo mengine; Tafadhali taja ……..

SEHEMU YA 2: TAARIFA KUHUSU MAUMIVU

16. Kipimo cha maumivu aliyopima mtoto …….

17. Kipimo cha maumivu aliyopima mzazi/mlezi ……..

18 . Kipimo cha maumivu aliyopima Muuguzi ……..

ASANTE KWA KUSHIRIKI

Appendix F

Unstructured questionnaire; English version

1. What methods are employed to assess the child's pain for this child?

   …….

   …….

2. What methods are used to relieve pain in children with burn injuries?

   Pharmacological

   ……..

   ……..

   Non-pharmacological

   ……..

   ……..

   Is the pain relief satisfactory?

   ……..

   ……..

3. What are factors that prevent effective pain management now at your working place?

   ……

   ……

4. What suggestions do you have for improving burn care for children?

   ……..

   ……..

THANK YOU FOR YOUR PARTICIPATION

Appendix G

Unstructured questionnaire; Swahili version

Maswali ya usaili

1. Ni mbinu zipi zinazotumika kuchunguza mtoto wako kuangalia kama ana maumivu?

   …….

   …….

2. Ni mbinu zipi zinazotumika kupunguza maumivu kwa mtoto wako?

   Kwa kutumia dawa

   ……..

   ……..

   Mbinu nyingine bila dawa

   …….

   …….

   Wewe na mtoto wako mnaridhika na tiba ya maumivu anayopata?

   ……...

   ……...

3. Ni vitu gani vinasababisha tiba ya maumivu kuwa hafifu au isiwe nzuri?

   .....

   ……

4. Ni maoni gani uliyonayo kwa ajili ya kuboresha tiba ya maumivu kwa watoto wenye majeraha ya kuungua moto?

   ……

   ……...

ASANTE KWA KUSHIRIKI

Appendix H

Informed consent form for children; English version

To be completed by the caregiver



MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RESEARCH AND PUBLICATIONS, MUHAS

CONSENT FORM FOR CHILDREN

ID NO | | | | | | | | | | |

Consent to participate in a study: entitled **"A BURNED CHILD'S PAIN DURING TREATMENT AS ASSESSED BY THE CHILD, CAREGIVER AND THE NURSE"**

Greetings! My name is Joseph Lekule, a 2nd year student Master of Science in Nursing - critical care and trauma at Muhimbili University of Health and Allied Sciences (MUHAS), working on this research project with the objective of assessing pain management in under-ten years old children with burn injuries admitted at KCMC consultant hospital, Tanzania

Purpose of the study:

The purpose of this study is to assess pain management in children with burn injuries admitted at KCMC hospital

Participation in this study:

The study will involve three groups of participants i.e. children with burn injuries, nurses caring for children with burn injuries and caregiver of the child. I have read and understood that, if I allow my child to participate in the study I will be required to answer interview questions and I will also be required to measure my child's pain according to my view.

Confidentiality:

All information collected during this study will be kept strictly confidential and will not be revealed to anybody outside the research team.

Risks:

We do not expect that any harm will happen to your child because of joining this study. May be you caregiver may be tired/exhausted because of the nature of the interview, but you will be able to stop the interview temporarily or decline at any time if you feel uncomfortable

Rights to withdraw and alternatives

Allowing your child to take part in this study is completely your choice. If you choose your child not to participate in the study or if you decide to stop your child participating in the study your child will continue to receive all services that he/she would normally get from the ward. You can stop your child participating in this study at any time even if you have already given consent

Benefits:

There will be no direct benefit to your child from participating in this study. However, the information that you provide about your child may help health professionals to better understand gaps and magnitude of pain that children with burn injuries are experiencing as background pain or procedural pain and find the solutions for it to enhance the lives and comfort of children and promote wound healing.

In case of injury

We do not anticipate that any harm will occur to your child as a result of participation in this study. However, if any physical injury occurs to your child resulting from participation in this study, we will provide him/her with medical treatment according to the current standards of care in Tanzania. There will be no additional compensations to him/her.

Who to contact:

If you ever have questions about this study, you should contact the study coordinator or principal investigator Mr, Joseph Lekule, Tel- 0754-455932, Muhimbili University of Health and Allied Sciences, P.O. Box 65001 Dar es Salaam. If you ever have questions about your child's rights as a participant, you may call Prof. Mainen J. Moshi, Chairman of the Senate Research and Publications Committee. P.O. Box 65001, Dar es Salaam. Tel 2150302-6 2152489

Signature:

Caregiver agrees…….. Caregiver does NOT agree ……

I _____ have read the contents in this form. My questions have been answered. I give permission for the child (named above) to be included in this study.

Signature of Caregiver _____

Relationship of caregiver to the child _____

Signature of researcher _____

Date of signature _____

Appendix I

Fomu ya idhini ya ushiriki wa mtoto katika utafiti; Chapa ya kiswahili

Ijazwe na mzazi/mlezi wa mtoto

CHUO KIKUU CHA AFYA NA SAYANSI SHIRIKISHI MUHIMBILI

IDARA YA UTAFITI NA USAMBAZAJI WA TAARIFA ZA UTAFITI

FOMU YA IDHINI YA KUSHIRIKI UTAFITI WA MTOTO

Namba ya Utambulisho

Idhini ya kushiriki katika utafiti unaohusu "TIBA YA MAUMIVU KWA WATOTO WALIO NA UMRI CHINI YA MIAKA KUMI WALIO NA MAJERAHA YA KUUNGUA MOTO KWA MTIZAMO WA WATOTO, WAUGUZI NA WAZAZI/WALEZI"

Salaam! Jina langu ni Joseph Lekule, mwanafunzi wa mwaka wa pili wa shahada ya Uzamili ya uuguzi (MSc, critical care and trauma) katika Chuo Kikuu cha Afya na Sayansi Shirikishi Muhimbili, ninafanya kazi ya utafiti huu nikiwa na dhumuni la kubaini huduma ya maumivu wanayopatiwa watoto walio na umri chini ya miaka kumi walio na majeraha ya moto waliolazwa hospitali ya rufaa ya KCMC

Lengo la Utafiti:

Utafiti huu utahusu watoto waliolazwa katika kitengo cha upasuaji KCMC kwa dhumuni la kubaini huduma ya maumivu wanayopatiwa watoto wenye majeraha ya moto walio na umri chini ya miaka kumi waliolazwa hospitali ya rufaa ya KCMC na hii itasaidia kuimarisha huduma hii na kupunguza maumivu kwa watoto nchini Tanzanian

Ushiriki katika Utafiti huu:

Utafiti huu utahusisha makundi matatu ya washiriki; watoto walio na umri chini ya miaka kumi, wazazi/walezi wa watoto hawa na wauguzi wanaowapa huduma ya matibabu. Ukikubali mtoto wako kushiriki; utahitajika kujibu maswali ya usaili yatakayotolewa na mtafiti kuhusu majeraha ya moto na matibabu ya maumivu kwa mtoto wako

Usiri:

Taarifa zote zitakazopatikana katika utafiti huu kuhusu mtoto wako zitahifadhiwa na kulindwa kwa siri na hazitaonyeshwa wala kutolewa kwa mtu yeyote asiye miongoni mwa watafiti.

Madhara:

Hatutarajii madhara yoyote yataweza kutokea kwa mtoto wako iwapo atashiriki katika utafiti huu.

Haki ya Kujiondoa katika Utafiti/Vinginevyo:

Kuhusika kwa mtoto wako katika utafiti huu hakika ni uchaguzi wako. Kama hutataka mtoto wako kushiriki katika utafiti huu, au kama utaamua kusimamisha ushiriki wake katika utafiti huu, ataendelea kupata huduma zote kama kawaida alizokuwa ukizipata awali katika wodi/idara aliyolazwa. Unaweza kuamua mtoto wako kuacha kushiriki katika utafiti huu muda wowote hata kama umeshapatiwa fomu ya idhini ya kushiriki.

Faida:

Hakutakuwa na faida ya moja kwa moja kwa mtoto wako kutokana na kushiriki katika utafiti huu, ingawa taarifa utakazotoa kuhusu mtoto wako zinaweza kuwasaidia wataalam kada za afya kuelewa ukubwa wa tatizo la maumivu kwa watoto wenye majeraha ya moto na namna ya kutatua tatizo hili.

Endapo Madhara yatatokea:

Hatutarajii kuwa madhara yoyote yatatokea kwa mtoto wako iwapo utashiriki katika utafiti huu. Kama madhara yoyote yatatokea kwa mtoto wako kutokana na kushiriki kwake katika utafiti huu, atapatiwa matibabu kulingana na Mwongozo wa Utoaji huduma kwa aagonjwa nchini Tanzania. Hakutakuwa na fidia nyingine dhidi yake

Kwa Mawasiliano:

Kama una maswali kuhusu utafiti huu, wasiliana na Mtafiti; Bwana, Joseph Lekule, simu- 0754-455932, kutoka Chuo Kikuu cha Afya na Sayansi Shirikishi Muhimbili, S.L.P. 65001 Dar es Salaam. Kama una maswali zaidi kuhusu haki zamtoto wako kushiriki katika utafiti huu, wasiliana na Prof. Mainen J. Moshi; Mwenyekiti wa Baraza la Tafiti na Machapisho, S.L.P. 65001, Dar es Salaam. Simu- 2150302-6 2152489.

Sahihi:

Kukubali kwa mzazi/mlezi …… Kukataa kwa mzazi/mlezi ……

Mimi _____ nimeisoma na kuielewa fomu hii ya idhini ya ushiriki wa mtoto wangu kwenye utafiti huu. Maswali yangu yamejibiwa na nakubali mtoto wangu kushiriki katika utafiti huu.

Sahihi ya mzazi/mlezi _____

Uhusiano kwa mtoto _____

Sahihi ya Mtafiti _____

Tarehe _____

Appendix J

Informed consent for nurses

To be completed by nurses

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RESEARCH AND PUBLICATIONS, MUHAS

CONSENT FORM FOR NURSES

ID NO | | | | | | | | | | | |

Consent to participate in a study: entitled "**A BURNED CHILD'S PAIN DURING TREATMENT AS ASSESSED BY THE CHILD, CAREGIVER AND THE NURSE**"

Greetings! My name is Joseph Lekule, a 2nd year student Master of Science in Nursing - critical care and trauma at Muhimbili University of Health and Allied Sciences (MUHAS), working on this research project with the objective of assessing pain management in under-ten years old children with burn injuries admitted at KCMC consultant hospital, Tanzania

Purpose of the study:

The purpose of this study is to assess pain management among children with burn injuries admitted at KCMC hospital

Participation in this study:

The study will involve three groups of participants i.e. children with burn injuries, nurses caring for children with burn injuries and caregiver of the child. I have read and understood that, if I participate in this study I will be required to answer short interview questions and measure the child's pain according to my view

Confidentiality:

All information collected during this study will be kept strictly confidential and will not be revealed to anybody outside the research team.

Risks:

We do not expect that any harm will happen to you because of joining this study. May be you may be tired/exhausted because of the nature of the interview, but you will be able to stop the interview temporarily or decline at any time if you feel uncomfortable

Rights to withdraw and alternatives

Taking part in this study is completely your choice. If you not to participate in the study or if you decide to stop participating in the study, there will not be any associated penalty and you will lose nothing. You can stop participating in this study at any time even if you have already given consent

Benefits:

There will be no direct benefit from participating in this study. However, the information that you provide will help health care professionals to better understand gaps and magnitude of pain that children with burn injuries are experiencing as background pain or procedural pain and find the solutions for it to enhance the lives and comfort of the children and promote their wound healing.

In case of injury

We do not anticipate that any harm will occur to you as a result of participation in this study.

Who to contact:

If you ever have questions about this study, you should contact the study coordinator or principal investigator Mr, Joseph Lekule, Tel- 0754-455932, Muhimbili University of Health and Allied Sciences, P.O. Box 65001 Dar es Salaam. If you ever have questions about your rights as a participant, you may call Prof. Mainen J. Moshi, Chairman of the Senate Research and Publications Committee. P.O. Box 65001, Dar es Salaam. Tel 2150302-6 2152489

Signature:

The nurse agrees …….. The nurse does NOT agree ……

I _____ have read the contents in this form. My questions have been answered. I give permission to be included in this study.

Signature of the nurse _____

Signature of researcher _____

Date of signature _____

Appendix K

Approval of Ethical Clearance letter

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

Directorate of Postgraduate Studies

P.O. BOX 65001
DAR ES SALAAM
TANZANIA.

Website: http://www.muhas.ac.tz

Tel: +255-(0)22-2150302 Ext 207.
Tel (Direct): +255-(0)22-2151378
Telefax:255-(0)22-2150465
E-mail: *dpgs@muhas.ac.tz*

Ref. No. MU/PGS/SAEC/Vol. VI/

17th April, 2013

Mr. Joseph A. Lekule,
MSc. Nursing Critical Care and Trauma,
MUHAS.

RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED "NURSING CARE OF UNDER-TEN YEAR OLD CHILDREN WITH BURN INJURIES: ASSESSMENT OF THEIR PAIN MANAGEMENT AT KCMC HOSPITAL"

Reference is made to the above heading.

I am pleased to inform you that, the Chairman has on behalf of the Senate approved ethical clearance for the above-mentioned study.

Thus ethical clearance is granted and you may proceed with the planned study.

Please liaise with the Bursar's office to get your research fund.

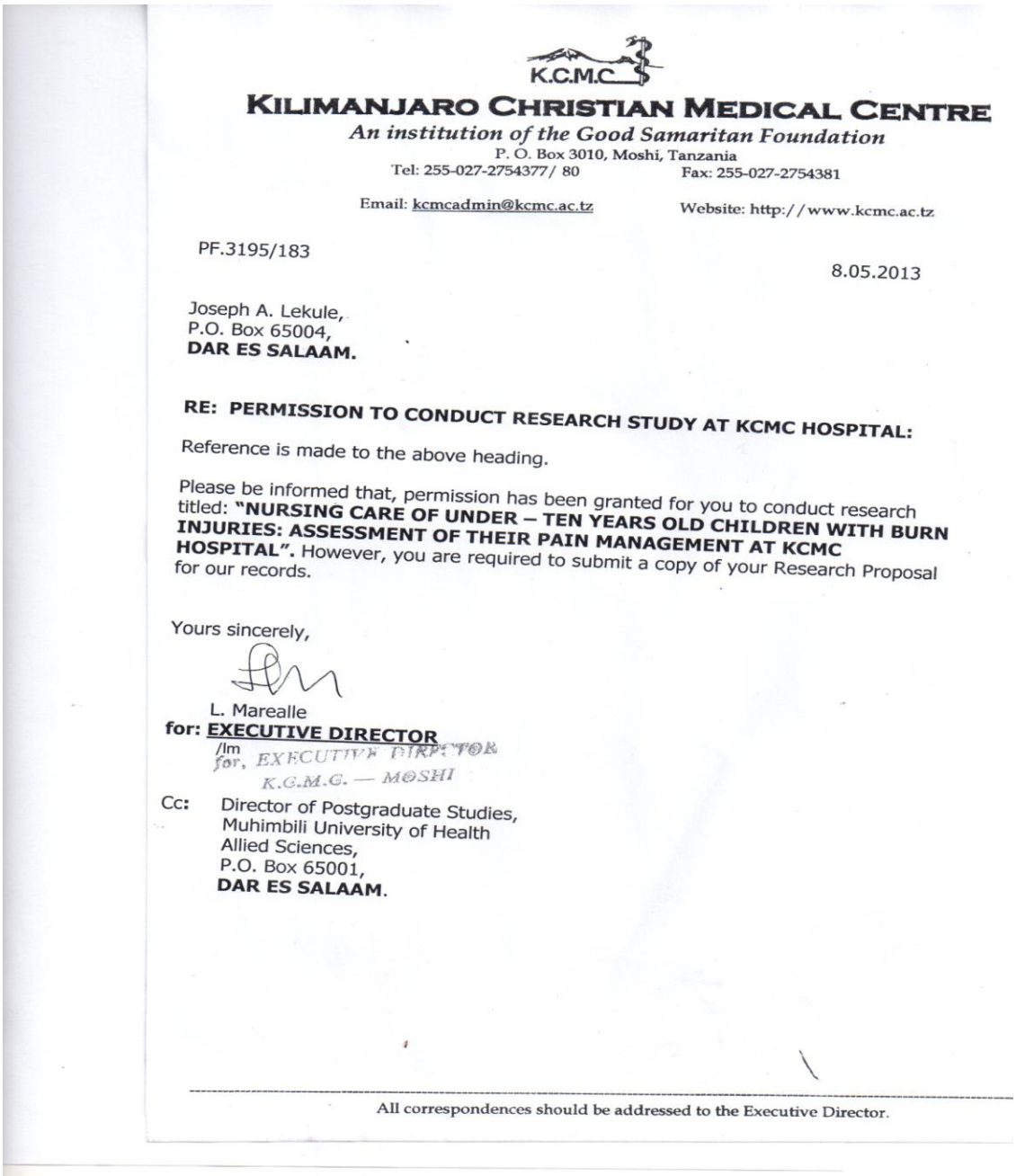
Prof. O. Ngassapa
DIRECTOR, POSTGRADUATE STUDIES

/emm

cc Vice Chancellor, MUHAS
cc Deputy Vice Chancellor – ARC, MUHAS
cc Dean, School of Nursing, MUHAS

Appendix L

Permission Letter



K.C.M.C

KILIMANJARO CHRISTIAN MEDICAL CENTRE

An institution of the Good Samaritan Foundation

P. O. Box 3010, Moshi, Tanzania
Tel: 255-027-2754377/ 80 Fax: 255-027-2754381
Email: kcmcadmin@kcmc.ac.tz Website: http://www.kcmc.ac.tz

PF.3195/183

8.05.2013

Joseph A. Lekule,
P.O. Box 65004,
DAR ES SALAAM.

RE: PERMISSION TO CONDUCT RESEARCH STUDY AT KCMC HOSPITAL:

Reference is made to the above heading.

Please be informed that, permission has been granted for you to conduct research titled: **"NURSING CARE OF UNDER – TEN YEARS OLD CHILDREN WITH BURN INJURIES: ASSESSMENT OF THEIR PAIN MANAGEMENT AT KCMC HOSPITAL".** However, you are required to submit a copy of your Research Proposal for our records.

Yours sincerely,

L. Marealle
for: EXECUTIVE DIRECTOR
/lm
for, EXECUTIVE DIRECTOR
K.C.M.C. — MOSHI

Cc: Director of Postgraduate Studies,
Muhimbili University of Health
Allied Sciences,
P.O. Box 65001,
DAR ES SALAAM.

All correspondences should be addressed to the Executive Director.