

**PREVALENCE, SEVERITY AND INITIAL MANAGEMENT OF PAIN AMONG
CHILDREN ADMITTED IN KENYATTA NATIONAL HOSPITAL GENERAL
PAEDIATRIC WARDS**

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H58/68367/2011

**DISSERTATION SUBMITTED IN PART FULFILLMENT OF THE REQUIREMENTS
OF THE UNIVERSITY FOR THE DEGREE OF MASTER IN MEDICINE
PAEDIATRICS AND CHILD HEALTH.**

UNIVERSITY OF NAIROBI

NOVEMBER 2014

DECLARATION

I declare that this dissertation is my original work and has not yet been published elsewhere or presented for a degree in any other university.


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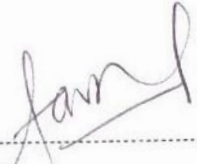
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To my beloved family: my father Dr. Ephantus Mate, my mother Mrs. Grace Mate and my siblings Jacqueline, Winfred, Caroline and Catherine.

ACKNOWLEDGEMENTS

I would like to express my sincere appreciation to:

- My supervisors Prof. E.M. Obimbo, Dr A. Laving and Dr V. Ali for guidance and invaluable input throughout the study process.
- Dr Chris Rodrigues for his support and guidance.
- The caregivers and the children who participated willingly in the study.
- Ambrose Agweyu for his assistance in data analysis.
- Yvonne Juma and Savatia for their assistance in data collection
- Family, friends and colleagues who have provided their support and guidance throughout the study process.
- Kenyatta National hospital and University of Nairobi.

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LIST OF ABBREVIATIONS

FLACC Face, Legs, Activity, Crying and Consolability.

FPS_R Revised, Faces Pain Scale.

PMI Pain Management Index

DEFINITIONS OF TERMS

Pain

An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage.

Analgesia

Absence of pain in response to stimulation that would normally be painful

Central pain

Pain associated with a lesion in the central nervous system (brain and spinal cord).

Chronic pain

Pain that persists despite the fact that the injury has healed

Pain signals remain active in the nervous system for weeks, months or years.

Neuropathy

A disturbance of function or pathological change in a nerve

Neuropathic pain

Pain which is transmitted by a damaged nervous system and which is usually only partially opioid-sensitive

Nociceptors

A receptor preferentially sensitive to noxious stimuli or stimuli which would become noxious if prolonged

Nociceptive pain

Pain which is transmitted by an undamaged nervous system and is usually opioid responsive

Pain threshold

The least experience of pain which a subject can recognize

Pain tolerance level

The greatest level of pain which a subject is prepared to tolerate

Procedural pain

Pain related to clinical procedures/interventions

Total pain

Encompasses physical, psychological, cultural, social and spiritual pain

ABSTRACT.

Background

Acute pain is one of the most common adverse stimuli experienced by children, occurring as a result of injury, illness, and necessary medical procedures. Pain is associated with increased anxiety, avoidance, somatic symptoms, and increased parent distress. Despite the magnitude of effects that acute pain can have on a child, it is often inadequately assessed and treated, especially in the African setting, where resources and skills are limited and overwhelming acute life-saving events override pain management.

Study Objectives

To determine the prevalence, severity and initial management of pain among children hospitalized at KNH, general paediatric wards

Methods

This was a cross sectional study in children age 1 month to 12 years admitted in KNH general paediatric ward, within 24 hours of admission. Eligible patients were consecutively recruited into the study between October and December 2013 until a desired sample size was reached .Using a structured questionnaire and two age appropriate pain scales; **Faces, Legs, Activity, Crying and Consolability scale (FLACC)** for patients aged 1 - 47 months and **Revised Faces Pain scale (FPS_R)** for patients age 4 -12 years, data was collected on presence, location and severity of pain within the first 24 hours of admission into the ward. Patient's treatment sheets and nursing charts were reviewed to determine initial pain management.

Results

Between the months of October to December 2013, out of 503 patients in the general paediatric wards who met the inclusion criteria, 400 participants/caregivers gave consent and were enrolled to participate in the study. Participants between the age of 1 – 47 months (Younger children) were 288/400 (72%) with a median age of 10 months (IQR 3, 20) whereas participants between the age of 4 -12 years (Older children) were 112/400 (28%) with a median age of 8 years (IQR 5, 10). The male to female ratio for both age groups was 1.2:1 with males comprising 54% of the total study population.

Overall prevalence of pain among children hospitalized in KNH general paediatric wards was found to be 78%. Among the younger children, 38% were found to have mild pain, 29% moderate pain and 2 % severe pain associated with clinical procedures and underlying illness. Among the older children, 12% reported mild pain, 69% reported moderate pain and 5% reported severe pain.

Analgesics were provided to 59% of patients in pain, largely a single drug, most commonly paracetamol which was administered intermittently. According to the pain management index, only half of the patients in pain received adequate analgesia.

Conclusion

Pain is common among hospitalized children at KNH general paediatric wards occurring in 78% of the participants most (71%) of whom experience mild to moderate pain.

Pain management is poor with only 50 % of patients with pain receive adequate analgesia.

Recommendations

- 1.** Use of Pharmacologic (i.e. Topical analgesic creams/ spray) and non- pharmacologic interventions by the healthcare workers to reduce pain due to clinical procedures.
- 2.** Training of health care providers on appropriate use and proper dosing of analgesics in the paediatric population.

INTRODUCTION

Sub-Saharan Africa bears a disproportionate measure of the global burden of many diseases, as well as their attendant morbidities, including pain (1). The prevalence of pain is amplified by lack of access to health facilities, late presentation, inadequate diagnosis, treatment unavailability, lack of medical education regarding pain control, and scarcity and under-prescribing of opioids.

Pain in sub-Saharan Africa has been studied primarily in three patient populations: HIV/AIDS patients, cancer patients, and palliative care patients. The prevalence of pain in African patients with HIV ranges from 59 to 98%, depending on disease stage, similar to the pain prevalence found in other HIV patient populations (2). Cancer, increasingly prevalent in sub-Saharan Africa with rates of cancer expected to quadruple over the next 50 years, is also frequently associated with pain (3). One study conducted in Uganda and South Africa found the prevalence of pain was 87.5% in cancer patients attending palliative care services (4). Patients at the ends of their lives are particularly vulnerable to pain. A study of hospice patients in Uganda found that two-thirds had experienced severe, prolonged pain before having their pain adequately treated. In Kenya, researchers have found that patients at the ends of their lives often die in pain.(5)(6).

“An important responsibility of physicians who care for children is eliminating or assuaging pain and suffering when possible”. It has been well documented, however, that in this regard a substantial percentage of children have been undertreated (7). The American Academy of Paediatrics (AAP) and the American Pain Society (APS) jointly issued this statement to

underscore the responsibility of pediatricians to take a leadership and advocacy role to ensure humane and competent treatment of pain and suffering in all infants, children, and adolescents.

LITERATURE REVIEW

Definition of Pain

In 1968, McCaffery defined pain as “whatever the experiencing person says it is, existing whenever s/he says it does”. This definition emphasizes that pain is a subjective experience with no objective measures. It also stresses that the patient, not clinician, is the authority on the pain and that his or her self-report is the most reliable indicator of pain. In 1979, the International Association for the Study of Pain (IASP) introduced the most widely used definition of pain. The IASP defined pain as an “unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.” This definition emphasizes that pain is a complex experience that includes multiple dimensions (8).

Pathophysiology of Pain

Nociception refers to the process by which information about tissue damage is conveyed to the central nervous system (CNS). Exactly how this information is ultimately perceived as painful is unclear. In addition, there can be pain without nociception (e.g., phantom limb pain) and nociception without pain.

Classic descriptions of pain typically include four processes:

1. **Transduction:** The conversion of the energy from a noxious thermal, mechanical, or chemical stimulus into electrical energy (nerve impulses) by sensory receptors called nociceptors

2. **Transmission:** The transmission of these neural signals from the site of transduction (periphery) to the spinal cord and brain
3. **Perception:** The appreciation of signals arriving in higher structures as pain
4. **Modulation:** Descending inhibitory and facilitory input from the brain that influences (modulates) nociceptive transmission at the level of the spinal cord.

The basic pathways thought to underlie the perception of pain were originally described by the Melzack-Wall gate control theory in 1965.

This theory states that the detection and transmission of pain from the periphery takes place by A-delta and C nerve fibers that travel to the spinal cord, where a reflex withdrawal arc is triggered. Pain impulses are simultaneously transmitted up the spinal cord to the thalamus and cortex. Various ascending and descending pathways from the cortex and reticular formation allow levels of arousal and higher cognitive functioning to modify the basic pathway (9).

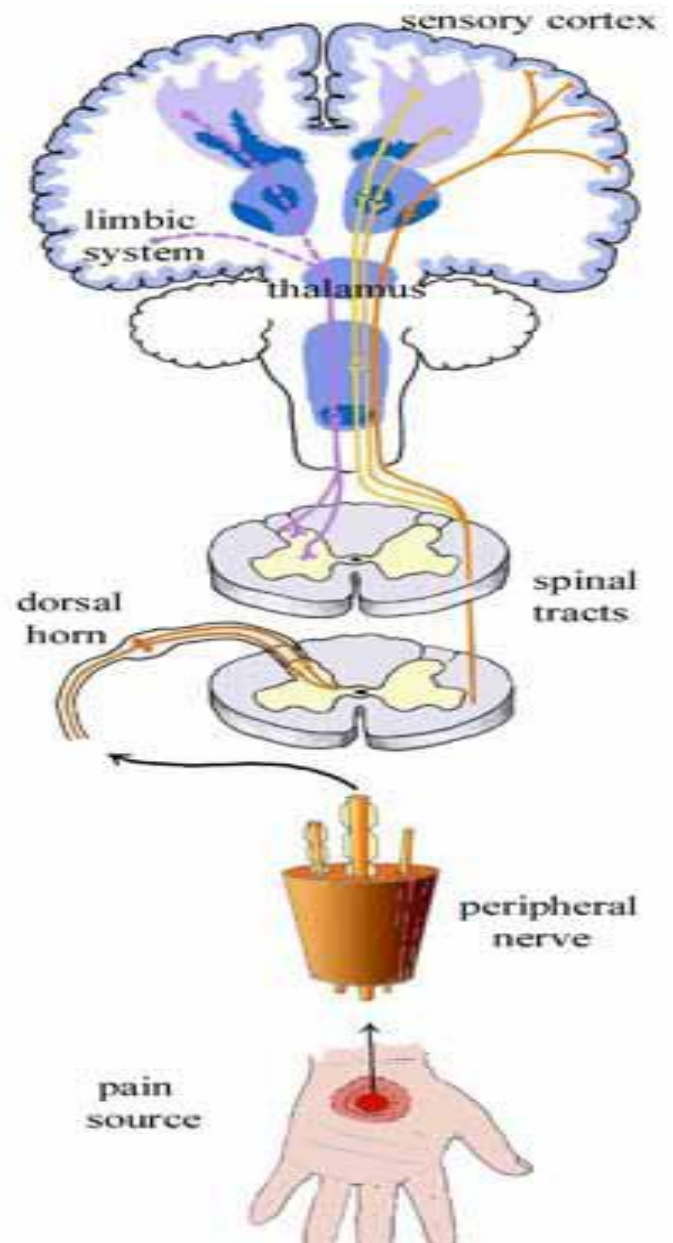


Figure 1: Basic Pathway Involved In Pain Perception

Classification of Pain

Pain can be classified according to: Duration, Underlying mechanism, Situation (10).

1. Classification according to duration.

- Acute Pain

Usually due to a definable acute injury or illness and may have a definite onset. Its duration is limited and predictable often accompanied by anxiety and clinical signs of sympathetic over-activity. Treatment is directed at the acute illness or injury causing pain, with short term use of analgesics.

- Chronic Pain

Results from a chronic pathological process and may have a gradual or ill-defined onset, continuous unabated and many become progressively more severe; may persist longer than expected healing time for the injury or illness in question. It often leads to the patient appearing depressed or withdrawn and possibly being labeled 'not looking like someone in pain'. Chronic pain offers no protective benefits, serves no purpose and has detrimental effects causing changes at the level of the nervous system as well as psychological burden. Treatment is directed at the underlying disease where possible along with regular use of analgesics to relieve pain and prevent recurrence as well as psychological support.

2. Classification according to underlying mechanism.

- Nociceptive Pain

Produced by stimulation of specific sensory receptors in the **viscera** and **somatic** structures (although the nerves are intact). Somatic pain is characteristically superficial (cutaneous) in the skin, subcutaneous tissue or mucous membranes. Sharp and well localized pain in deep muscles, tendons and joints. Visceral pain arises from organs and is characteristically dull and poorly localized. The sensation of pain may be referred to a cutaneous site, often associated with autonomic responses such as sweating, nausea.

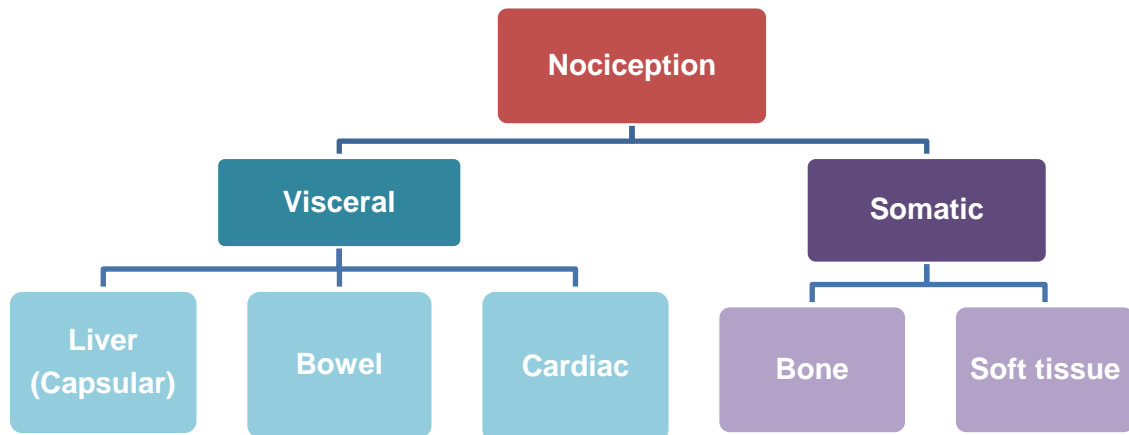


Figure 2: Nociceptive Pain

- Neuropathic Pain

Produced by injured nerves of the central or peripheral nervous system and is characterized by burning sensation or dysaesthesia, shooting pain, aching sensation relieved by pressure applied to the affected area. Neuropathic pain can also present as increased sensitivity to a pain stimulus (hyperalgesia) or to a stimulus that is not normally painful (allodynia). Neuropathic pain is a diagnosis/ clinical description, but requires a demonstrable lesion, or a disease that satisfies established neurological diagnostic criteria.

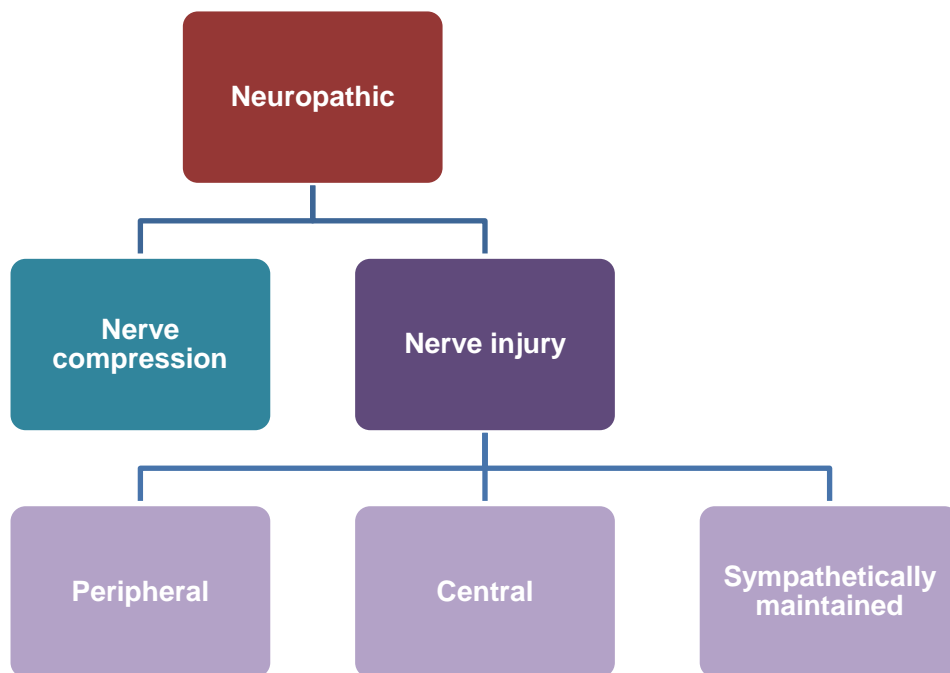


Figure 3: Nociceptive Pain

3. Classification according to situation

- Breakthrough pain; Transitory exacerbation of pain that occurs on a background of otherwise controlled pain.
- Incident pain; Occurs only in certain circumstances such as after a particular movement.
- Procedural pain; Related to clinical procedures and interventions.

Pain Assessment

Pain assessment facilitates diagnosis and disease monitoring and enables the health professional to alleviate needless suffering. The location, quality, severity, and duration should be viewed as important clinical signs since the changes in a child's pain may signal a change in the disease process. This assessment should be continuous because the disease process and the factors that influence the attendant pain change over time. It must therefore include not only measurement of pain severity but also an evaluation of how the various health care, child and family factors may influence the pain. Responsibility for pain assessment should be shared by both health professionals and the child's family and caregivers (11).

The “ABCs” of Pain Assessment in Children

- Assess.

Always evaluate a sick child for potential pain. Children may experience pain even though they may be unable to express the fact in words. Infants and toddlers can only show their pain by how they look and act: Older children may deny their pain for fear of more painful treatment.

- Body.

Be careful to consider pain as an integral part of the physical examination. Physical examination should include a comprehensive check of all body areas for potential pain sites. The child's reactions during the examination - grimacing, contracture, rigidity, etc. - may indicate pain.

- Context.

Consider the impact of family, healthcare and environmental factors of the child's pain.

- Document.

Record the severity of a child's pain on a regular basis. Use a pain scale that is simple and appropriate both for the developmental level of the child and for the cultural context in which it is used.

- Evaluate.

Assess the effectiveness of pain interventions regularly and modify the treatment plan as necessary, until the child's pain is alleviated or minimized.

Perception of Pain in Children and the Factors which affect Pain Expression

There are many factors that influence the way pain is experienced and a patient's tolerance of pain, such as biological factors, tissue damage and the individual differences in Nociceptive and emotional factors. Arguably, depending on different cultural backgrounds, not all children may experience the same level of pain (12). In some cultures pain is not expressed until sometime after the injury/painful event indicating that individual cultures have different levels of tolerance to pain (13). However, there is a lack of contemporary research regarding the influence of culture and ethnicity on pain.

a) The impact of cognitive development

Cognitive development plays an active role in the perception and expression of pain because, as children mature in terms of cognitive development, they can describe their pain more effectively (14). In particular, it is thought that 'sensory and emotional' experience is not communicated effectively by younger children (15). However, despite a large number of studies conducted, there is no consensus regarding the age at which children can communicate emotional experiences such as pain effectively.

b) Pain and language expression

Language plays an important part in health care, especially in the aspect of pain communication. However, children often express pain using words comprising vowels only such as 'ooo', 'aiee', 'oy' and 'oh', making it more difficult to distinguish between types of pain (16).

The way in which pain is expressed helps health professionals to understand the patient's reaction and responses to pain in order to optimize pain management (17). However, the expressive abilities of children can also be affected by stress, which often accompanies illness, hence if the person's psychological balance is disturbed then expression is affected (18). The measurement of pain during a critical condition in a stressful situation can lead to misconceptions. Further, if hospital is perceived as a stressful place for children, it can affect their emotional reactions (and expression of pain).

a) Impact of culture

Diverse family and cultural beliefs can lead to significant variations in how children learn about pain and how they behave when in pain (19). However, *Hadjistavropoulos and Craig 2004* (20) proposed that the patient's culture is not the only factor that affects assessment of pain; health professional cultures may also interfere with this process in the hospital setting. There are other factors besides race and ethnicity that affect responses to pain, including age, gender and language ability. A number of studies have suggested that there is a difference between responses to the painful stimuli according to gender (21)(22)(23). These studies reported that females are more likely than males to report pain to health professionals; however, further studies are needed to draw definitive conclusions about the association between pain and gender.

Pain assessment tools

Pain assessment is an intrinsic component of pain management in infants and children. Clinicians need an objective measure of pain intensity and an understanding of the factors that cause or exacerbate pain for an individual child. Thus, extensive research has focused on designing pain measures that are convenient to administer and whose resulting scores provide meaningful information about children's pain experiences. More than 60 pain measures are now available for infants, children, and adolescents (24). While no single pain measure is appropriate for all children and for all situations in which they experience pain; we should be able to evaluate pain for almost every child.

There is a pressing need for cross-cultural validation of functional and appropriate pain assessment tools for use in East Africa. Recently, particular attention has been paid to Kenya regarding its failure to provide satisfactory pain assessment and control in children (25). Clinicians in Kenya are not trained to assess pain, pain assessment is not frequently performed in hospitals, and pain is often undertreated due to fear of opioids and lack of prioritization of pain relief. Assessing pain accurately and in a culturally acceptable manner are crucial first steps to combating these pain management challenges, both for pediatric and adult patients.

There are two broad classifications of pain scales:

- a) Observational scales.
- b) Self-report scales

a) Observational Pain Scales in Infants and Children.

A frequent challenge in pediatrics is assessing pain in children who are non-verbal. Part of this population is unable to report the location and degree of their pain because of chronological age, i.e. an infant or toddler (26). Physiological parameters including heart rate, respiration rate, blood pressure, palmar sweating, cortisol and cortisone levels, oxygen levels, vagal tone, and endorphin concentrations have been studied as potential pain measures. However, they reflect a complex and generalized stress response, rather than correlating with a particular pain level. As such, they may have more relevance as distress indices within a broader behavioral pain scale. Behavioral scales record the type and amount of pain-related behaviors children exhibit and they must be used for infants and children who are unable to communicate verbally.

The Faces, Legs, Activity, Cry, Consolability (FLACC) scale has been validated for measuring post-operative pain in children with mild to severe cognitive impairment. It has also been validated for the assessment of pain secondary to surgery, trauma, cancer or other painful diseases for all pre-verbal children (including infants) (26).

The table below shows the categories for scoring. Zero, one or two points are assigned to each of the five categories shown in the table: Face, Legs, Activity, Cry, and Consolability (hence the term, FLACC). Total points assigned may be from zero to ten. The numeric rating scale may be categorized into no pain, mild pain, moderate pain, and severe pain based on the 0-10 scale. The categories guide analgesic selection when the score is obtained.

Table 1: FLACC Scale

	0	1	2
Face	No particular expression or smile	Occasional grimace or frown; Withdrawn, Disinterested.	Frequent to constant frown, Clenched jaw, Quivering chin.
Legs	Normal position or relaxed	Uneasy, Restless, Tense	Kicking or legs drawn up.
Activity	Lying quietly, Normal position ,moves easily	Squirming, shifting back and forth, Tense	Arched, Rigid or jerking.
Crying	No cry (Awake or asleep)	Moans or whimper Occasional complaint.	Crying steadily, Screams or sobs; Frequent complaints
Consolability	Content, Relaxed	Reassured by occasional touching, hugging or being talked to; distractible.	Difficult to console or comfort

How to Use the FLACC scale:

- **In patients who are awake:** observe for 1 to 5 minutes or longer. Observe legs and body uncovered. Reposition patient or observe activity. Assess body for tenseness and tone. Initiate consoling interventions if needed.
- **In patients who are asleep:** observe for 5 minutes or longer. Observe body and legs uncovered. If possible, reposition the patient. Touch the body and assess for tenseness and tone.

Face

- Score 0 if the patient has a relaxed face, makes eye contact, and shows interest in surroundings.
- Score 1 if the patient has a worried facial expression, with eyebrows lowered, eyes partially closed, cheeks raised, mouth pursed.
- Score 2 if the patient has deep furrows in the forehead, closed eyes, an open mouth, deep lines around nose and lips.

Legs

- Score 0 if the muscle tone and motion in the limbs are normal.
- Score 1 if patient has increased tone, rigidity, or tension; if there is intermittent flexion or extension of the limbs.
- Score 2 if patient has hyper tonicity, the legs are pulled tight; there is exaggerated flexion or extension of the limbs, tremors.

Activity

- Score 0 if the patient moves easily and freely, normal activity or restrictions.
- Score 1 if the patient shifts positions, appears hesitant to move demonstrates guarding, a tense torso, pressure on a body part.
- Score 2 if the patient is in a fixed position, rocking; demonstrates side-to-side head movement or rubbing of a body part.

Cry

- Score 0 if the patient has no cry or moan, awake or asleep.
- Score 1 if the patient has occasional moans, cries, whimpers or sighs.
- Score 2 if the patient has frequent or continuous moans, cries, grunts.

Consolability

- Score 0 if the patient is calm and does not require consoling.
- Score 1 if the patient responds to comfort by touching or talking in 30 seconds to 1 minute.
- Score 2 if the patient requires constant comforting or is inconsolable.

Interpreting the Behavioral Score

- Each category is scored on the 0–2 scale, which results in a total score of 0–10.

0	No pain
1–3	Mild discomfort
4–6	Moderate pain
7–10	severe discomfort or pain or both

In a study conducted by pediatric nurses at the Children’s Medical Center of Dallas the FLACC scale was used to assess pain in 147 children under 3 years of age who were hospitalized in the pediatric intensive care unit (PICU), post-anesthesia care unit (PACU), surgical/trauma unit, hematology/oncology unit, or infant unit. This study concluded that the FLACC pain assessment tool is appropriate for preverbal children in pain from surgery, trauma, cancer, or other disease processes and the nurses also identified the FLACC Pain Assessment Tool as an easy and practical scale to use in quantifying and communicating preverbal children's pain (27).

Previous research in a post-anesthesia care unit at the center indicated that it was a valid and reliable tool that was easy to use with patients 2 months to 7 years of age

The FLACC scale has excellent interrater reliability, criterion validity, and constructs validity, thereby supporting its usefulness in assessing pain in critical care patients. Indisputably, self-report remains the gold standard for pain assessment, yet many patients cannot report their pain, an inability that may make them vulnerable to poor pain management (28).

b) Self-Report Scales for Children.

Because pain is primarily an internal experience not directly accessible to others, children's self-report should be the primary source of information on pain intensity when possible, on the basis of age, cognitive and communicative abilities, and situational factors. Parents' and nurses' perceptions of children's pain are based on their overt behavioral expression of pain and on the context; thus, they are not the same as children's self-reports of their internal experience of pain. Most children aged 5 years and older, and many 3- and 4-year-olds, can provide meaningful self-report of pain if age-appropriate tools are used. In other health studies that used children's self-report measures, there was general agreement that information should be obtained from both parents and children whenever possible, and although there may be discrepancies, neither should be dismissed. This concurs with opinion that, ideally, observational and/or physiologic measures should be used in conjunction with self-report measures and with knowledge of the context.

Children’s self-reports of pain are influenced by developmental, social, and contextual influences. The use of self-report pain scales has yet to be established for children with cognitive impairments (29).

The Faces Pain Scale Revised (FPS_R) for adults and children is a categorical scale with visual descriptors. The FPS_R consists of six images of faces with various expressions (e.g., smiling, frowning, grimacing) and the patient selects the face that is consistent with his or her current level of pain.

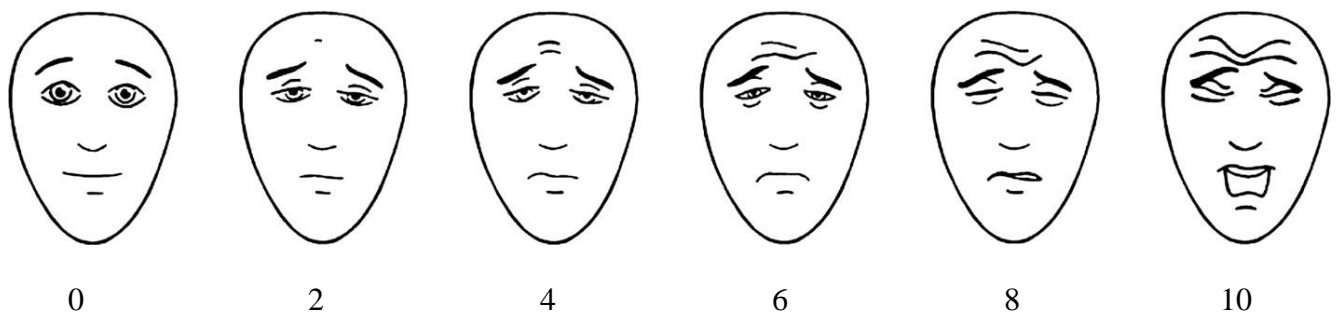


Figure 4: Faces Pain Scale Revised.

How to use the FPS-R scale:

- These faces show how much something can hurt. The face on the left shows no pain. The faces show more and more pain proceeding from left to right, up to the face on the right – it shows the most pain.

“Point to the face that shows how much you hurt right now.”

Interpreting the FPS-R scale

0	No pain
2-4	Mild discomfort
6-8	Moderate pain
10	Severe discomfort or pain.

In a study performed at Moi Teaching and Referral Hospital (MTRH) in Eldoret, Kenya,(30) the FPS-R and NRS were adapted and translated for a population of Swahili-speaking patients in western Kenya and demonstrated the face validity, acceptability, and field-readiness of these scales through cognitive interviewing of hospitalized patients at MTRH. Of the unidimensional pain assessment tools available, these scales were judged to be most practical for use in western Kenya, and they also correspond to the Kenyan Hospice and Palliative Care Association's recommendation of using a numerical scale and a faces scale for pain assessment. These tested translations use straightforward, non-idiomatic Swahili phrasing, which should make them usable in other Swahili-speaking countries of East Africa, as well as in immigrant populations worldwide. Participants found that the faces were easy to understand as they visibly depicted pain and the absence of pain. They felt that the illustrated expressions made it easier to choose a response to the pain scale, and that the faces make it easier for medical personnel to understand the pain that a patient is in.

The study concluded that dissemination and use of these pain tools in Kenya and East Africa could result in increased awareness of patients' pain and in an appropriate response in relieving their suffering

Pain Management

a) Non-drug pain relief therapy

Non drug therapies must be an integral part of management of children's pain. Beginning at the time of diagnosis and continuing throughout treatment. These therapies can be easily implemented in different settings and may substantially modify many of the factors that tend to increase pain.

In some situations, on drug therapy will activate sensory systems that block pain signals; in others it will trigger internal pain inhibitory systems. Non drug approaches should supplement but not replace appropriate drug treatment.

Non-drug approaches may be categorized as **supportive, cognitive, behavioral** or **physical** (31)**Supportive** therapies support and empower the child and the family. **Cognitive** therapies influence children's thoughts, **behavioral** therapies change behaviors, and **physical** therapies affect sensory systems. Most parents will intuitively use such approaches to relieve pain in their children – and children are usually aware that these methods can relieve pain.

Table 2: Non Drug Methods of Pain Relief (31)

Supportive	Cognitive	Behavioral	Physical
Family-centered care	Distraction	Deep breathing	Touch
Information	Music	Relaxation	Heat and Cold ^a
Empathy	Imagery		Transcutaneous electrical nerve stimulation(TENS)
Choices	Hypnosis		
Play			

^a Heat and Cold should not be used in infants because of risk of injury.

b) Analgesic drug therapy

- Key Concepts for Analgesic Drug Therapy

The non-drug approaches outlined above targets all causes of pain physical and psychological and should be an integral part of all interventions designed to control pain in childhood. However the optimal approach to pain management in children includes drug therapy. With analgesic drugs usually considered the mainstay of treatment. Correct use of analgesic drugs will relieve pain in most children and relies on the following four key concepts: *I) Ladder, II) Clock, III) Appropriate route, IV) Child.*

I) By the ladder

A three step approach to analgesia, described as an analgesic “ladder”, has repeatedly been shown to be effective. Pain is classified as mild, moderate or severe and analgesic choices are adjusted accordingly. The sequential use of analgesic drugs is based on the child’s level of pain and the first step in controlling mild pain is a non-opioid analgesic. Paracetamol is the drug of choice for children who take oral medication. If pain persists, an opioid for mild to moderate pain should be given: Codeine is the drug of choice for this purpose.

Children should continue to receive Paracetamol/ non-steroidal anti-inflammatory drug (NSAID) if appropriate, for supplementary analgesia. When an opioid for mild to moderate pain combined with a non-opioid fails to provide relief, an opioid for moderate to severe pain should be substituted: again, Paracetamol (or NSAID if appropriate) should be continued. Morphine is the drug of choice in this instance. Adjuvant drugs may be given for specific indication.

II) By the clock

Medication should be administered according to a regular schedule i.e. “by the clock”. Rather than a *Pro re nata* (prn) or as-required basis, unless pain episodes are truly intermittent and unpredictable. On a prn basis, children must experience pain before they are able to obtain medication; they may fear that the pain cannot be controlled and become increasingly frightened. In addition, the doses of opioids required to prevent the recurrence of pain are lower than those required to treat episodic pain.

Children should therefore receive analgesics at regular intervals with “rescue doses” for intermittent and breakthrough pain. The dosing interval should be determined according to the severity of the pain and the duration of action of the drug in question.

III) By appropriate route

Drugs should be administered to children by the simplest, most effective, and least painful route. Analgesics are usually given orally in the form of tablets and elixirs. Intravenous, subcutaneous and transdermal administration may also be appropriate. Considerations in selecting the best route of analgesic administration for children include: Severity of pain, type of pain, potency of the drug and required dosing interval.

IV) By the child

Doses of all medication must be based upon each child’s circumstances: there is no single dose that will be appropriate for all children. The goal is to select a dose that prevents the child from experiencing pain before the next dose is due to be administered. It is essential to monitor the child’s pain regularly and to adjust analgesic doses as necessary to control it.

Pain Management Index (PMI)

The pain management index (PMI) as suggested by Strohbuecker et al (32) was originally designed to assess the adequacy of pain treatment in adult cancer patients, and has since been used in other pain prevalence studies.

The PMI is calculated by subtracting pain scores from analgesic scores.

- The pain scores are classified into: 0 = No pain, 1= Mild pain, 2 = Moderate pain, 3 = Severe pain.
- The analgesic scores derived from the WHO ladder are classified into:
0 = no analgesic, 1 = WHOI (non-opioid analgesia), 2 = WHOII (weak opioid), 3 = WHOIII (strong opioid)

The PMI ranges from -3 to 3; negative scores indicate under-treatment. Positive scores do not necessarily represent over-treatment; a patient's pain score may be low because of appropriate analgesia provided by a strong opioid, thereby resulting in a positive PMI.

Factors influencing the under management of children's pain (33)

Numerous factors have been identified as contributing to the under management of children's pain, including:

- Myths and misconceptions about the treatment of children's pain.
- Health care professionals' attitudes and beliefs about paediatric pain
- Lack of knowledge about paediatric pain management, from the use of narcotic analgesics to non-pharmacological interventions
- Inadequate assessments of children's pain.
- Lack of value placed on using research findings to lead pain practices.

Consequences of Under-treatment of Pain

The cost of unrelieved pain is high, and can have both short- and long-term consequences for children. When a child is in pain, the body releases stress hormones that cause several systemic changes such as increased heart rate and blood pressure, weakened immune function, and delayed healing. These changes, in turn, can lengthen a hospital stay for a child. Unsuccessful procedures with resultant increases in procedural time can create significant distress and trauma for children.

The development of maladaptive responses to future painful procedures has also been well documented and includes:

- Higher pain intensities with fear and non-compliance during future interventions.
- Conditioned anxiety responses to all procedures.
- Diminished analgesic effectiveness with subsequent procedures and avoidance of medical care.
- Predisposition to persistent or chronic pain states.
- Negative memories of previous painful events leading to significant anticipatory stress and anxiety for future procedures.

Table 3: Physiological Consequences of Unmanaged pain

RESPONSE TO PAIN	POTENTIAL PHYSIOLOGIC CONSEQUENCES
Respiratory changes	
<ul style="list-style-type: none"> • Rapid shallow breathing. • Inadequate lung expansion. • Inadequate cough 	Alkalosis Decreased oxygen saturation, atelectasis. Retention of secretions
Neurological changes	
<ul style="list-style-type: none"> • Increased sympathetic nervous system activity and release of catecholamines. 	Tachycardia, elevated blood pressure, change in sleep patterns, irritability
Metabolic changes	
<ul style="list-style-type: none"> • Increased metabolic rate with increased perspiration. • Increased cortisol production 	Increased fluid and electrolyte losses. Increased cortisol and blood glucose levels
Immune system changes	
<ul style="list-style-type: none"> • Depressed immune and inflammatory responses 	Increased risk of infection, delayed wound healing
Gastrointestinal changes	
<ul style="list-style-type: none"> • Increased intestinal secretions and smooth muscle sphincter tone, nausea, anorexia 	Impaired gastrointestinal functioning, poor nutritional intake, Ileus
Altered pain response	
<ul style="list-style-type: none"> • Increased pain sensitivity 	Hyperalgesia, decreased pain threshold, exaggerated memory of painful experiences

STUDY JUSTIFICATION & UTILITY

Acute pain is one of the most common adverse stimuli experienced by children, occurring as a result of injury, illness, and necessary medical procedures. Despite the magnitude of effects that acute pain can have on a child, it is often inadequately assessed and treated, especially in the African setting, where resources and skills are limited and overwhelming acute life-saving events override pain management. The prevalence of pain is amplified by lack of access to health facilities, late presentation, and inadequate diagnosis, and treatment unavailability, lack of medical education regarding pain control, and scarcity and under prescribing of opioids.

The local prevalence of pain among hospitalized children remains unknown. Studies carried out in Brazil and Canada have demonstrated that prevalence of pain among hospitalized children is very high (59% to 77%) (34, 35). In the Canadian study, conducted by Taylor Et al at a paediatric teaching hospital, Majority of the participants (68%) were found to have moderate to severe pain predominantly associated with clinical procedures. In the same study, pain management with analgesics was largely intermittent and single-agent. 58% of those with pain received analgesics but only 25% received regular analgesia. It was concluded that pain was infrequently assessed, yet occurred commonly across all age groups and services. Although effective, analgesic therapy was largely single-agent and intermittent.

In order to address practical issues such as pain assessment and documenting as part of routine patient care and introduction of hospital based pain management protocols, it is vital to determine the prevalence of pain among hospitalized children.

STUDY OBJECTIVES

Study question?

What is the prevalence and severity of pain among children hospitalized in Kenyatta National Hospital general paediatric wards?

Primary objective

To determine the prevalence and severity of pain among children hospitalized in Kenyatta National Hospital general paediatric wards.

Secondary objective

To describe the initial management of pain within 24hours of admission among children hospitalized in Kenyatta National Hospital general Paediatric wards.

METHODOLOGY

Study design

This was a hospital-based cross sectional survey.

Study site

The study was carried out in the general paediatric wards of KNH, a tertiary level and a teaching hospital for the University of Nairobi (UoN) Medical School. The general pediatric wards have total capacity of 240 beds although the bed occupancy is often over 100%. There are 14,000 paediatric admissions annually. Sixty to seventy five trainee pediatricians, who are enrolled in a three year postgraduate pediatric training programme in the UoN, provide most clinician-patient care. They are normally supervised by 25 Consultant paediatricians from KNH and University of Nairobi. There are 126 qualified nurses who provide care on the four general pediatric wards.

Study duration

This study was carried out in the year 2013 during the months of October and November.

Study population

Children were eligible for inclusion into the study if they fulfilled the following criteria:

1. Age 1 month to 12 years.
2. Hospitalized in Kenyatta National Hospital - general Paediatric wards for less than 24 hours.
3. Written informed consent obtained from the primary caregiver and assent from children above 8 years.

Exclusion criteria

Children were excluded if they were cognitively impaired.

Sample size

The Sample Size was using Fischer's Formula for Prevalence studies:

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

Where:

N is the desired minimal Sample Size

Z is the table value for the standard normal deviate approximate significance level of 5 % (1.96) which corresponds to 95% confidence interval.

P is the estimated prevalence of pain among children admitted in the general pediatric wards; estimated at 50% (No similar studies available locally).

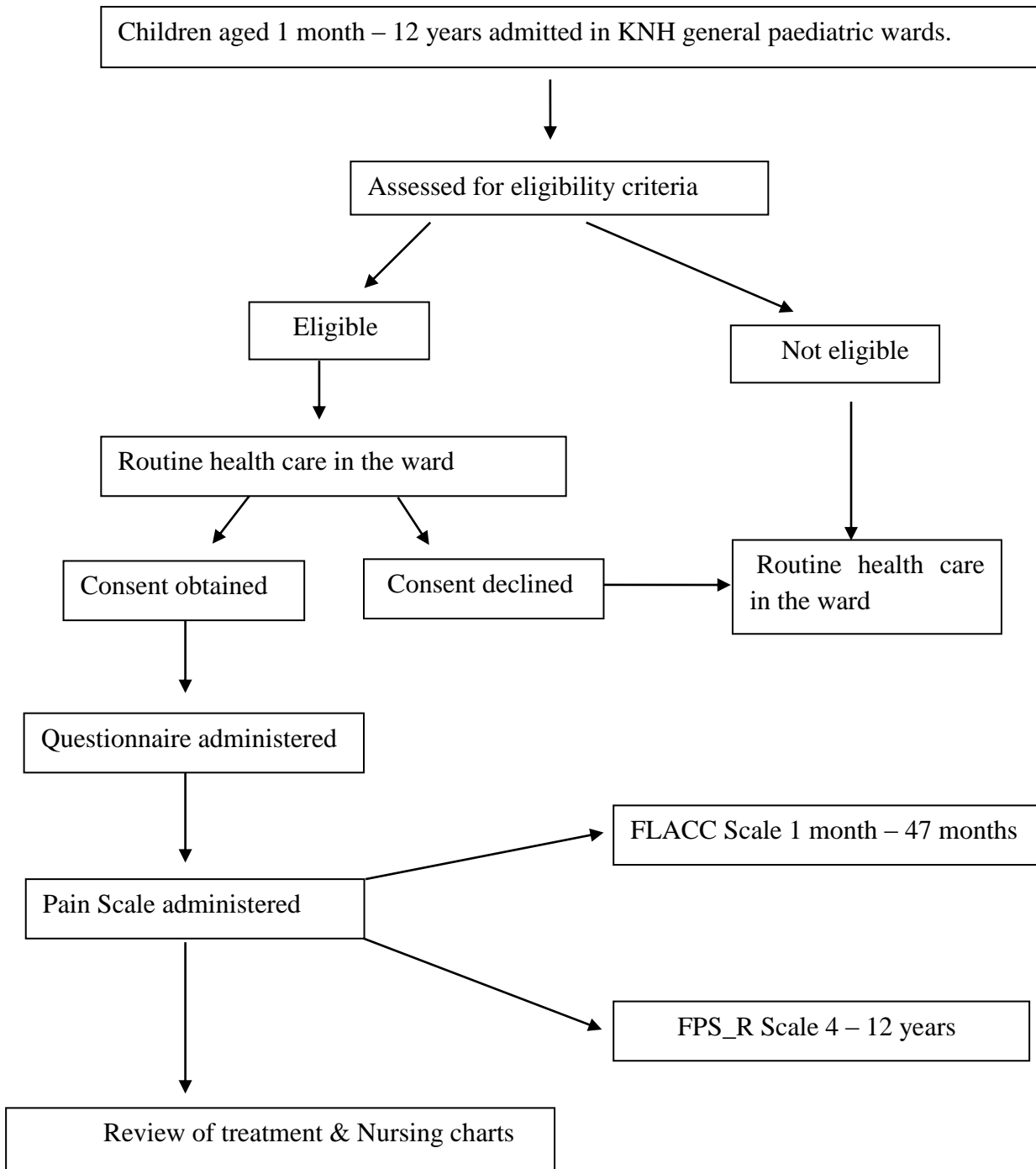
d Is the degree of precision set at + or - 5%.

Substitution of formula:

$$N = \frac{1.96^2 \times 0.5 \times (1 - 0.5)}{0.05^2}$$

$$N = 384$$

Figure 5: Flow Chart Detailing Patient Recruitment and Data Collection



Study Tools and Clinical Definitions

The two instruments used for collection of information on pain were as follows:

1. Faces, Legs, Activity, Crying and Consolability Scale (FLACC)

Ages 1 month- 3 years:

The FLACC scale has been validated for measuring post-operative pain in children with pain secondary to surgery, trauma, cancer or other painful diseases for all pre-verbal children (including infants). Table 1 shows the categories for scoring.

Zero, one or two points are assigned to each of the five categories shown in table 1. Total points assigned may be from zero to ten.

Table 4: Classification of Severity of Pain Using The FLACC Scale

(Severity of Pain)	
0	No pain/Discomfort
1 -3	Mild Pain/Discomfort
4 -6	Moderate Pain/Discomfort
7 -10	Severe Pain/ Discomfort

2. **Faces Pain Scale Revised (FPS-R) Age 4 -12 years:**

FPS-R is a categorical scale with visual descriptors. The FPS-R consists of six images of faces with various expressions. (e.g., smiling, frowning, grimacing) and the patient selects the face that is consistent with his or her current level of pain.

Table 5: Classification of Severity of Pain Using The Revised Faces Pain scale.

(Severity of Pain)

0	No pain
2 – 4	Mild Pain
6 – 8	Moderate Pain
10	Severe Pain

Pain Management Index (PMI)

The PMI is a measure of the adequacy of treatment in relation to the patient's degree of pain and is calculated by subtracting the **Pain score** from **Analgesic score**.

PMI = Analgesic score – Pain Score.

- The pain score is classified into:

0 = No pain, **1**= Mild pain, **2** = Moderate pain and **3** = Severe pain

- According to the WHO Analgesic ladder, the Analgesic score is classified into:

0 = No analgesic, 1 = WHO I (non-opioid analgesia), 2 = WHO II (weak opioid), 3 = WHO III (strong opioid).

The PMI ranges from –3 to 3; negative scores indicate under-treatment .Positive scores do not necessarily represent over-treatment; a patient’s pain score may be low because of appropriate analgesia provided by a strong opioid, thereby resulting in a positive PMI.

Procedures

Patient Sampling

All participants meeting the inclusion criteria were recruited consecutively by the principal investigator/Research assistants within 24 hours of admission into the general paediatric wards, seven days a week for the entire period of the study until a desired sample size was reached. Informed consent was then signed allowing the participant to take part in the study.

Data collection

Research assistants were trained on the use of the data collection tools, in particular, prompts or explanations of questions for the interview portion were standardized to limit inter-interviewer variability and bias.

A structured questionnaire was administered to the participant and caregiver to collect data on socio-demographic characteristics, clinical diagnosis at admission. An age appropriate pain scale was then administered to determine presence and severity of the pain [Appendix]. Finally a focused review of the participant's treatment sheet and nursing chart was carried out to determine initial pain management in terms of: Type of intervention given, dosage of pain medication and frequency of administration of pain medication.

Participants and caregivers were interviewed whenever possible and it was the interviewer's assessment of the child's developmental capacity to understand the questions and provide information on their pain and treatment that determined whether the caregiver; usually a parent, would answer as proxy. This assessment was based on the patient's age, Clinical diagnosis (e.g. developmental delay) and current clinical status (e.g. sedated, altered mental state).

If required, clarification of a participant's capacity to understand was obtained from the caregiver and treating clinicians. When the caregiver answered the verbally administered questionnaire as proxy, the pain severity assessment was still obtained from the participant if possible, and it was the participant's assessment of severity of pain that was used in the analysis of results.

The Primary investigator/Research assistants then reviewed treatment sheets and nursing charts of all the participants with an aim to identify if the participant had received any pain management since admission. The type of analgesic prescribed and administered, including dosage and frequency of administration was recorded. Clarification of pain management was obtained from participants and caregivers.

If the participant and/or caregiver were absent on the initial visit, subsequent visits within 24 hours of admission were attempted. If the participant was absent on three visits, they were not included in the study. Participants having offsite procedures were approached for enrollment once they returned to their ward.

The pain management index (PMI) was then calculated by subtracting pain scores from analgesic scores. Cases of participants found to be inappropriately managed or not managed for pain and caregivers who were not be aware of the management were forwarded to the primary doctor on the ward. The primary investigator; a paediatric registrar at the University of Nairobi prescribed the appropriate pain medication for un-managed/poorly managed pain and forwarded the treatment sheet to the nurse taking care of the patient when the primary doctor on the ward was not available.

This was to ensure that no participant was left in pain following recording of the data obtained. Participants found to have chronic / recurrent untreated pain were referred to the KNH palliative care unit for further management.

DATA MANAGEMENT AND ANALYSIS

Data collected through the questionnaires was reviewed by the primary investigator. Data was then entered into Epi Info database and analysis was performed using Statistical Package for Social Sciences (SPSS) version 17.0.

Continuous variables were summarized using means and standard deviations and categorical variables such as sex, level of education and presence or absence of pain were summarized using proportions with associated 95% confidence intervals.

Prevalence of pain was calculated using the total number of enrolled patients (n=400) as the denominator and total number of enrolled patients in pain as the numerator. Severity of pain was analyzed among the patients found to be in pain and categorized into mild, moderate and severe pain based on FLACC scale and FPS_R scale for ages (1month – 47 months) and (4 – 12 years) respectively. Location/site of pain as well as clinical procedures carried out within 24 hours of admission was separately analyzed.

Data on initial management of pain was analyzed and categorized into; Participants found to be in pain and received analgesia. This category was further classified into correctness of administering analgesics in terms of dosage given, frequency of administration of analgesic and route of administration. Proportion of participants found to be in pain but did not receive analgesia was also be analyzed.

RESULTS

Between the months of October to December 2013, out of 503 patients eligible for the study, 90 of the patients declined to give consent and 13 of them were away for off-site procedures at the time of the interview. We interviewed and enrolled 400 patients and their primary caregivers from 4 general paediatric wards.

A. Socio-demographic characteristics of study population

The Median age for the study population was 17 months (IQR 6, 60). Age distribution was as follows: 288/400 (72%) aged 1 – 47 months (younger children) with a median age of 10 months (IQR 3,20) and 112/400(28%) aged 4 -12 years(older children) with a median age of 8 years(IQR 5,10). The male to female ratio for both age groups was 1.2:1 with males comprising 54% of the total study population.

The majority of the study population 310/400 (78%) had their mother as their primary caregiver. The Median age of caregivers among the younger children was 28 years (IQR 25, 32) and 37 years (IQR 33, 40) among the older children.

In regard to level of education, 67% of caregivers for younger children and 88% for the older children had completed secondary education and beyond

Table 6: Participant and Caregiver Demographics (n = 400)

Patient characteristic	Frequency (%)	N	Frequency (%)	N
	or Median (IQR)		or Median (IQR)	
	<i>1 – 47 months</i>		<i>4 – 12 years</i>	
Age	10 months (3, 20)	288	8 years (5, 10)	112
Female gender	133 (46.2)	288	50 (44.6)	112
Relation of primary caregiver		288		112
Mother	251 (87.2)		59 (52.7)	
Father	34 (11.8)		52 (46.4)	
Other	3 (1.0)		1 (0.9)	
Age of primary caregiver in years	28 (25, 32)	288	37 (33,40)	112
Level of education of primary caregiver		288		112
No education	12 (4.2)		1 (0.9)	
Primary level	84 (29.2)		13 (11.6)	
Secondary level and beyond	192 (66.7)		98 (87.5)	

B. Prevalence of pain

Pain within 24 hours of admission was present in 310/400 giving a prevalence of 78% (95% CI). Among younger children using the FLACC scale 198/288 (69%) were found to be in pain. Prevalence of pain reported by primary care giver for younger children was higher at 91%. Among the older children, 112/112 (100%) reported pain within the first 24 hours of admission.

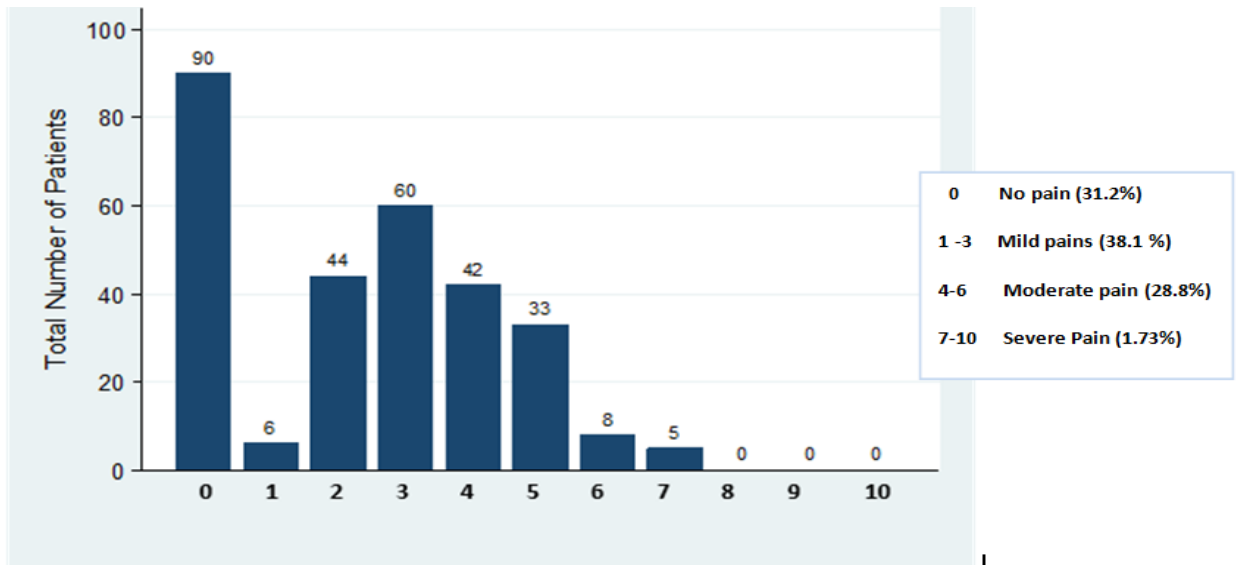
Table 7: Prevalence of Pain Among Hospitalized Children.

Age Group	No. In Pain	N	Prevalence (%), (95% C.I)
Young Children	198	288	68.8 (63.1 to 74.1)
Older children	112	112	100.0 (96.8 to 100)
Overall	310	400	77.5 (73.1 to 81.5)

C. Severity of Pain

Using the FLACC Scale, severity of pain among the younger children was as follows: Mild Pain 38%, Moderate pain 29% and only 2% were found to have severe pain. The most common symptoms of pain as reported by the caregiver were crying (78%), Irritability (7%) and holding painful area (5%).

Figure 5: Severity of Pain Among Patients Aged 1 - 47 months (FLACC Scale)



Among the older children, 69% reported moderate pain, 12% reported mild pain and only 5% reported severe pain associated with admission diagnosis. Clinical procedures in the Paediatric Emergency Unit (PEU) and the ward were associated with mild to moderate pain. Only 5% of patients reported severe pain associated with clinical procedures in the ward and no patients reported severe pain associated with clinical procedures in PEU.

Figure 6: Severity of Pain associated with Admission Diagnosis among Patients Age 4 -12 years (Self- report)

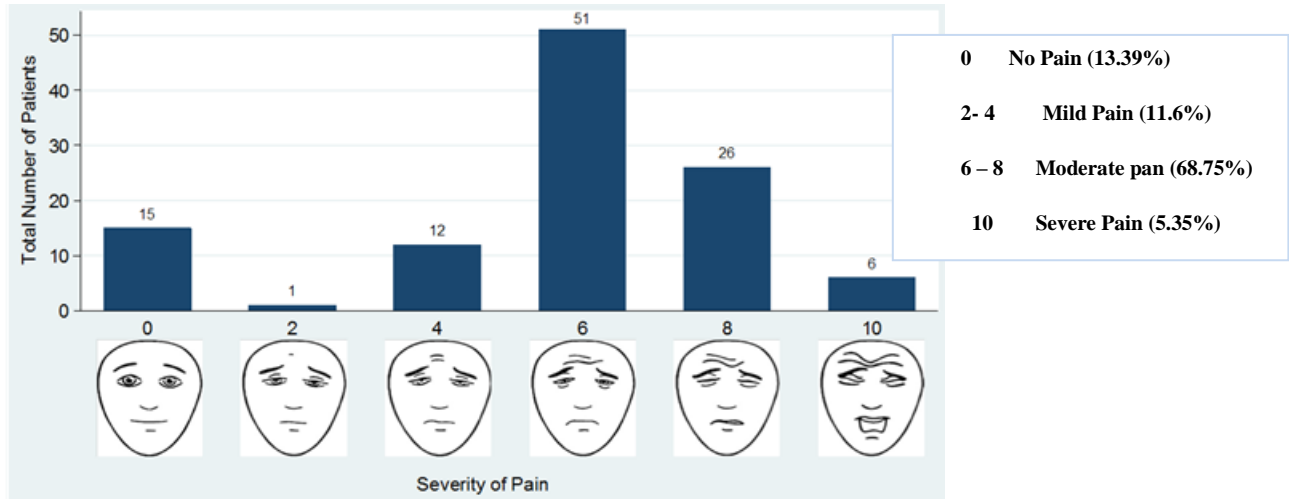


Figure 7: Severity of Pain associated with Clinical Procedures at PEU among Children Age 4 -12 years (Self Report)

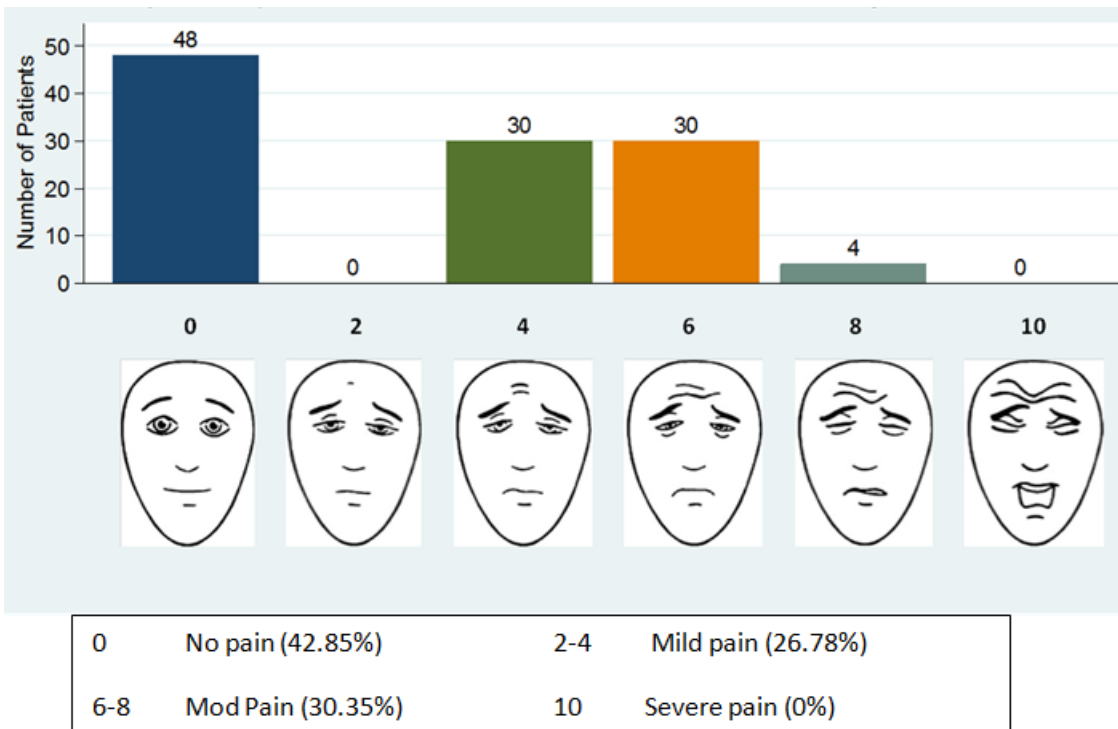
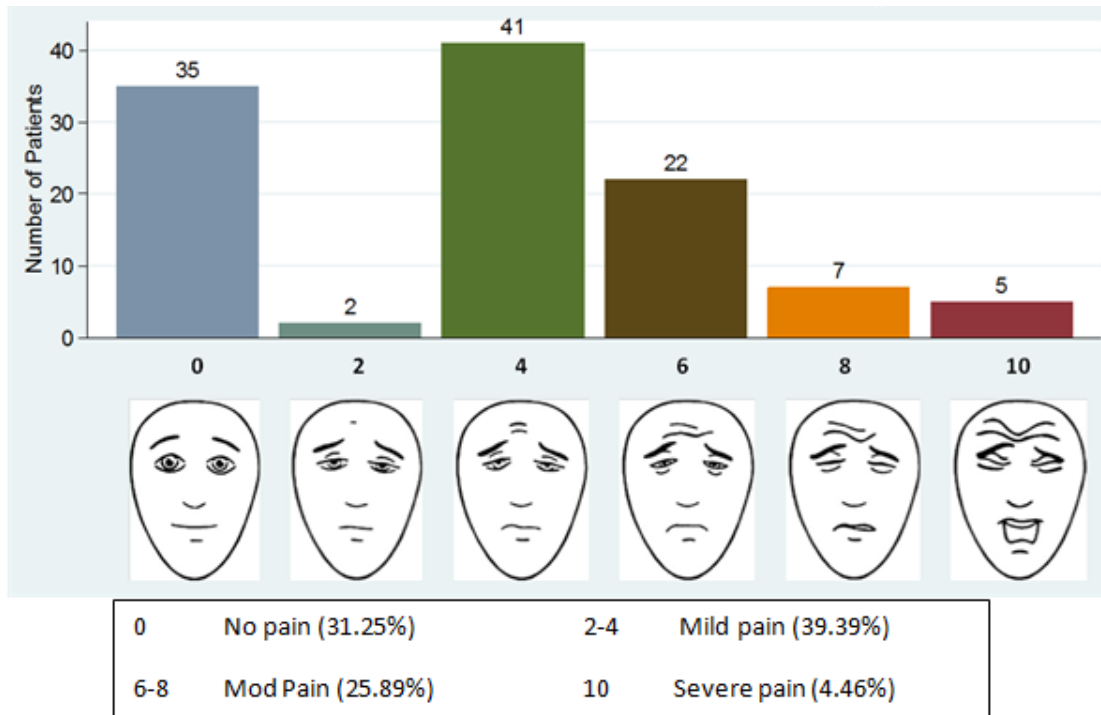


Figure 8: Severity of pain associated with Clinical Procedures in the Ward Among Children age 4 -12 years (Self - Report)



i. Admission Diagnoses associated with pain.

Clinical diagnoses associated with pain were comparable in both age groups. Sickle cell disease was the most common diagnosis associated with a high severity of pain with a 68% of all the children with this disease reporting moderate to severe pain. As shown on figure 7 below, other diagnosis associated with moderate- severe pain were meningitis, renal disease, cardiac disease and malignancies.

Table 8: Severity of Pain by Clinical Diagnosis (All Age Groups)

Diagnosis	None		Mild		Moderate / Severe		Total
	Frequency	%	Frequency	%	Frequency	%	
Meningitis	7	13	17	30	32	57	56
Lower respiratory infection	11	13	36	44	35	43	82
Malignancy	5	36	2	14	7	50	14
Sickle cell disease	7	21	4	12	23	68	34
Acute gastroenteritis	14	34	14	34	13	32	41
Hepatobiliary disease	9	53	1	6	7	41	17
Renal disease	3	14	7	32	12	55	22
Cardiac disease	3	23	3	23	7	54	13
Sepsis	12	60	5	25	3	15	20
Malaria	1	8	6	46	6	46	13
Convulsive disorder	4	36	4	36	3	27	11
Malnutrition	10	63	5	31	1	6	16
Other infectious disease	0	0	7	41	10	59	17
Other non-infectious	19	43	12	27	13	30	44

Figure 9: Severity of Pain by Clinical Diagnosis for Patients Age 1 -47 months

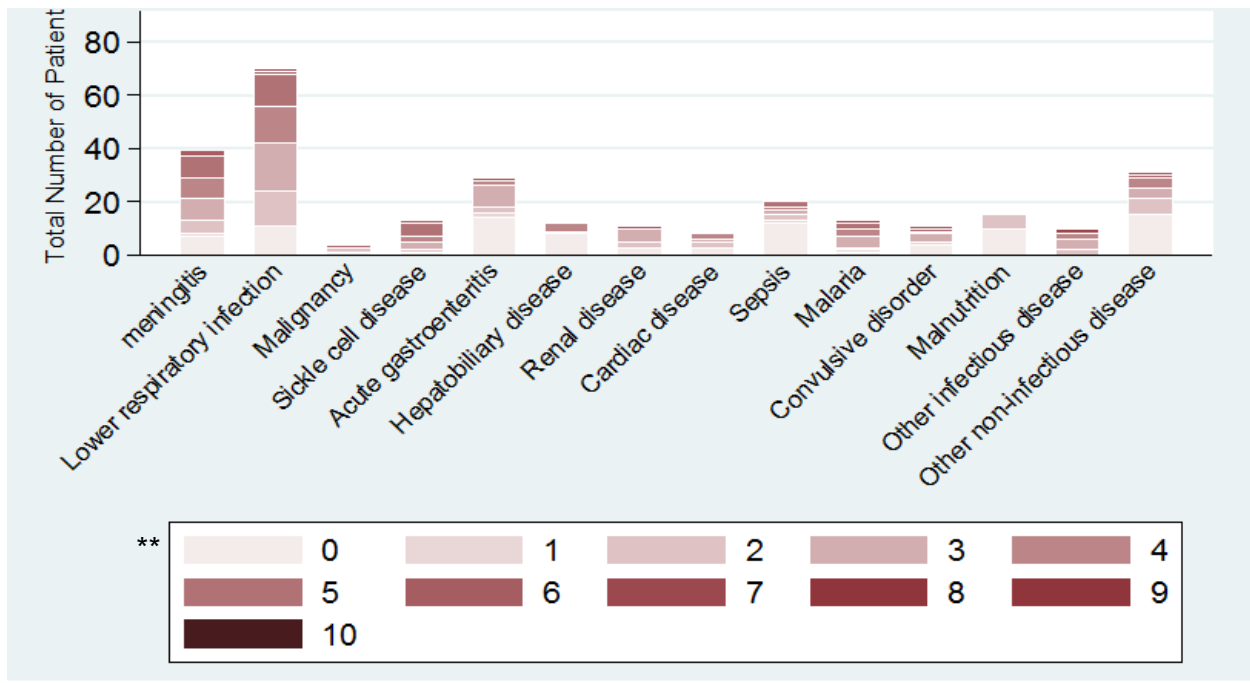
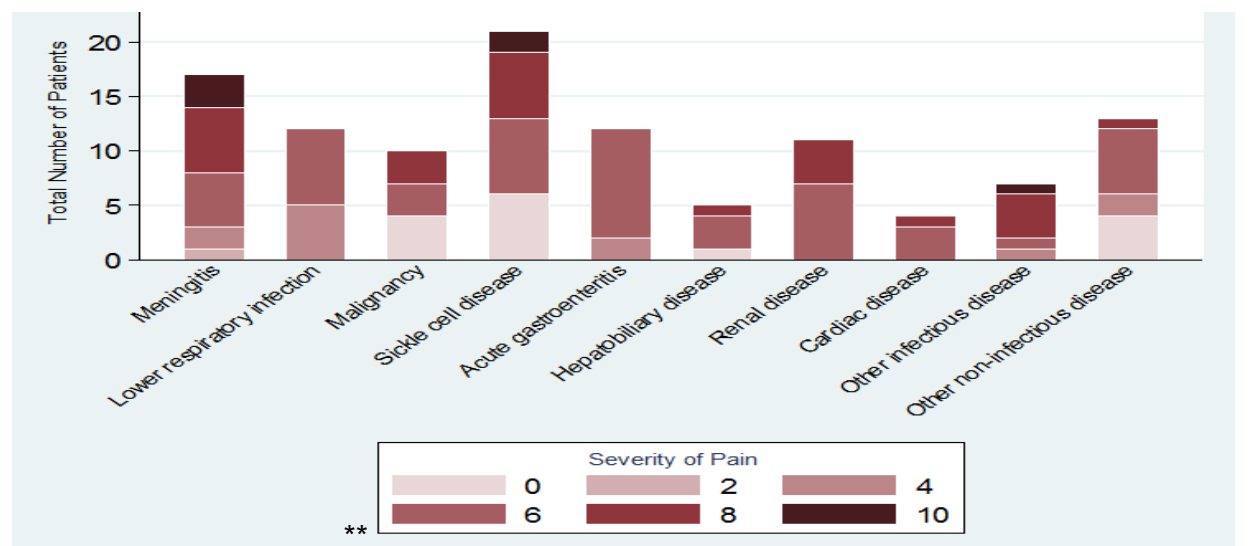


Figure 10: Severity of Pain by Clinical Diagnosis for patients aged 4- 12 years.



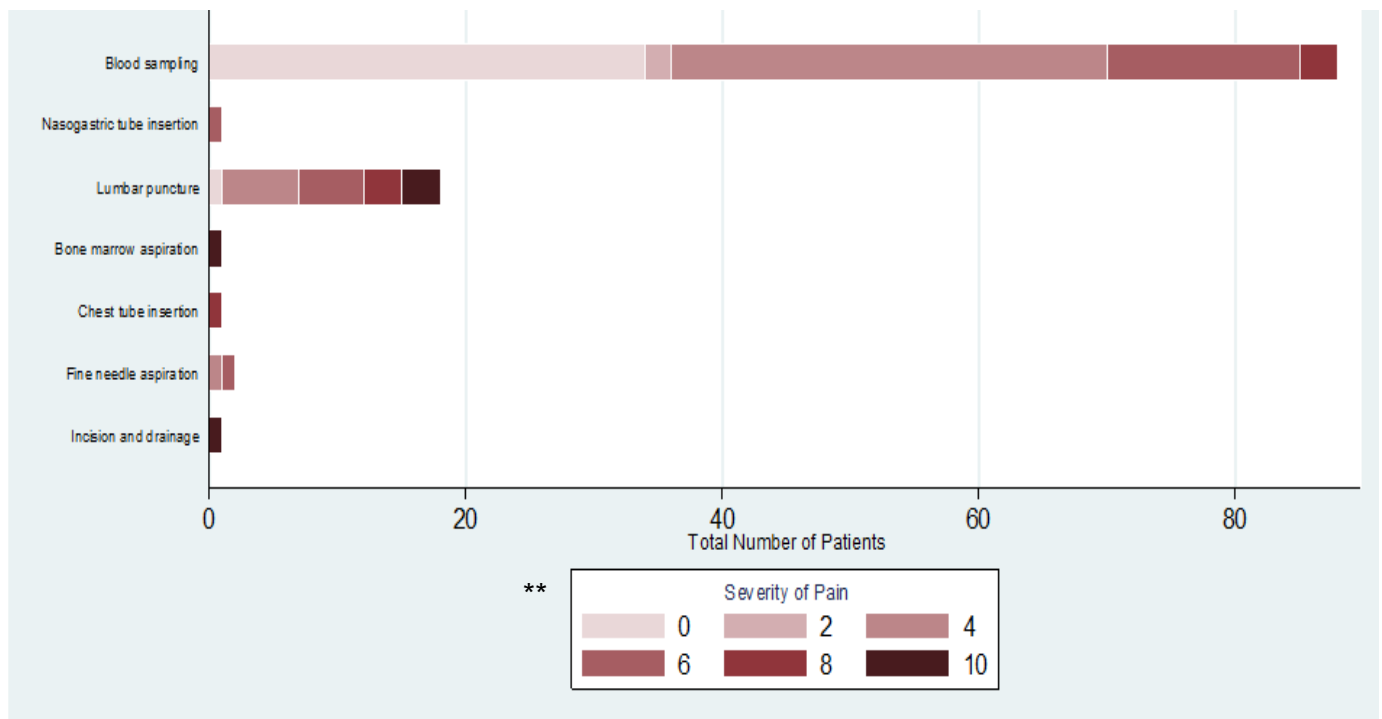
** Severity of pain in Figure 10 & 11 coded 0 - 10 using the FLACC and FPS-R Scale respectively where 0 = No Pain and 10 = Severe Pain.

ii. Clinical Procedures Associated with Pain.

Clinical procedures carried out in the ward and paediatric emergency unit (PEU) accounted for 397/400 (99%) of pain whereas pain due to underlying disease was lower at 314/400 (79%)

In both age groups, for procedures carried out both in PEU and the ward; the commonest site of pain was the upper limbs and the most frequently performed procedures at both locations were peripheral IV line insertion and blood sample collection. Other less frequent procedures carried out in PEU and the wards were: Lumbar puncture, Nasogastric tube insertion, fine needle aspiration, Bone marrow aspiration and paracentesis.

Figure 11: Severity of Pain Associated with Clinical Procedures Among Children Age 4 - 12 Years



** Severity of pain coded 0 - 10 using FPS-R Scale where 0 = No Pain and 10 = Severe

D. Pain Management

The majority of children with pain associated with admission diagnoses received analgesics, whereas only a few patients with pain due to clinical procedures were given analgesics among both age groups. Among the younger children 231/288 (80%) caregivers reported pain to a health care worker and 98/112 (88%) of the older children /caregiver reported pain to a healthcare worker. Analgesia provided was predominantly a single medication; most commonly Paracetamol and a few patients received Ibuprofen and dihydrocodeine and administration of analgesia was largely intermittent.

Table 9: Pain management

PATIENT CATEGORY	TOTAL NO.	N	ANALGESIA RECEIVED	
			N	(%)
PATIENT IN PAIN				
<ul style="list-style-type: none"> • Young Children (FLACC Scale) 	198	288		
<ul style="list-style-type: none"> ○ Admission Diagnosis(Caregivers Report) 	217		190/217	88
<ul style="list-style-type: none"> ○ Clinical procedure (Caregiver's Report) 	285		6/285	2
<ul style="list-style-type: none"> • Older Children (Self -Report) 	112	112		
<ul style="list-style-type: none"> ○ Admission Diagnosis 	97		84/97	85
<ul style="list-style-type: none"> ○ Clinical procedure 	112		4/112	4

PAIN REPORTED TO HEALTHCARE WORKER				
<ul style="list-style-type: none"> • Young Children (Reported by Caregiver) 	231	288		
<ul style="list-style-type: none"> ○ Admission Diagnosis 	219		190/219	87
<ul style="list-style-type: none"> ○ Clinical procedure 	53		6/53	11
<ul style="list-style-type: none"> • Older Children (Reported by Patient or Caregiver) 	98	112		
<ul style="list-style-type: none"> ○ Admission Diagnosis 	95		84/95	88
<ul style="list-style-type: none"> ○ Clinical procedure 	29		4/29	14
NO PAIN				
Young Children	90	288	26/90	29 **
Older Children	0	112	-	

** Patients who received analgesics despite not being in pain.

Patients who received analgesics despite not being in pain were thought to have received Paracetamol for management of fever.

- **PMI Score**

Using the PMI score to assess adequacy of treatment, only half of the patients who received analgesics had adequate management of pain. Among the patients who had pain in both age groups, 51% had a PMI score < 0 indicating under treatment and only 49% had a score between 0-3 indicating adequate analgesia.

DISCUSSION

This study set out to determine the prevalence, severity and initial management of pain among children who were hospitalized in KNH general paediatric wards. To our knowledge this is the first study that has looked at prevalence of pain among hospitalized children in sub-Saharan Africa. Pain was found to be very common in both age groups, with an overall prevalence of 78%. This is similar to previous studies carried out by Taylor et al at a Canadian tertiary paediatric teaching hospital (34) who found the prevalence of pain among hospitalized children to be 77% and Linhares Et al (35) who found prevalence of pain among hospitalized children at a public teaching hospital in Sao Paulo, Brazil to be 59%.

As expected, and similar to other studies, this study found that almost all (99%) of patients experienced pain associated with clinical procedures. The results varied in terms of severity of pain between this study where we found 71% of patients reported mild to moderate pain and only 3% reported severe pain, and the Canadian study where 64% of the patients reported moderate to severe pain. In this study we interviewed patients whenever possible and tried to get the pain assessment from the patient even when the primary caregiver answered the majority of the questionnaire. Among patients aged 4 – 12 years, self-reported pain intensity scores were highly correlated with caregiver ratings. However, when the child was preverbal (< 4 years) we had a behavioral pain scale used by the interviewer to assess severity of pain. In 2009, while working in the Queen Elizabeth Central Hospital in Blantyre, Malawi, as a nurse educator (from 2007 to 2009) Marie Ann Walters observed that African children are taught to be quiet and cooperative from a very early age. This she thought might be a result of cultural norms and expectations in this community (36). This may have been a factor contributing to the discrepancy in the severity of pain between the two studies.

In regard to clinical diagnosis associated with higher severity of pain, sickle cell disease was common to both age groups with a higher prevalence of severe pain among children aged 4 - 12 years. Periodic, episodes of musculoskeletal pain punctuate the lives of patients with sickle cell disease. Often referred to as "crises," these episodes are the principal cause of morbidity among these patients (37). Despite the obvious importance of this clinical syndrome, it is still frequently under-managed especially in the paediatric population. Among the younger age group 1 – 47 months of age, lower respiratory tract infections including pneumonia and bronchiolitis which have been shown to inflict a large burden of disease among children worldwide, were the commonest diagnosis associated with higher severity of pain.

In this study 100% of the older children reported their pain symptoms, primarily to their caregivers. The patients described their pain symptoms precisely, using dimensions of intensity and localization with majority of the patients reporting pain on the upper limbs associated with clinical procedures such as peripheral IV line insertion and blood sample collection. This result confirms findings from a study of Stanford et al. (38), in which children from 18 months of age were cognitively competent to communicate pain symptoms using spontaneous verbal descriptors. Considering that pain is a subjective phenomenon, it is very important to obtain a self-report of the child's pain, and such a report may be accessible from young, preschool-aged children. As we expected, non-verbal infants less than 48 months of age were absolutely dependent on caregivers to detect their pain symptoms. The primary caregivers identified their child's pain primarily through crying behaviors, and 80% of primary caregivers communicated their observations to the health professional team.

As pointed out by Anand et al. (39), pain evaluation in this especially vulnerable population is a challenge for health professional teams. Pain can be experienced by infants despite their inability to verbally communicate that experience. Repeated pain experiences suffered in the early stages of development by these vulnerable infants could provoke negative consequences in later childhood.

In regard to pain management, more than half (59%) of the patients found to be in pain received some intervention in the 24 hours preceding the interview. For these children, only pharmacologic interventions were administered. Non pharmacological interventions such as physical and psychological interventions were not administered to any of the patients found to be in pain. Paracetamol was the commonest analgesic provided for the patients in pain whereas Ibuprofen and dihydrocodeine were administered in < 5% of the patients. Documentation of pain management in the patients treatment sheet/nurses chart was well done but indicated that analgesics were not frequently administered. While the PMI has not been validated for use in a pediatric setting, which we acknowledge as a limitation, other analyses of frequency and type of analgesia corroborate the results of our PMI analysis. The finding that 51% of patients in pain had a PMI score below zero coupled with the finding that majority of the patients received inadequate analgesia suggests inappropriate use of analgesics and under treatment of pain. Similar to our findings, in the Canadian study Taylor found that administration of analgesics was largely intermittent and a single agent was used, 58% of patients received analgesia with only 25% receiving regular analgesia. Despite the available evidence about the effectiveness of pharmacological and non-pharmacological interventions for children's pain relief, this study suggests that pain management remains inadequate. Pharmacological interventions were predominantly used in all the patients found to be in pain.

However, non-pharmacological interventions were not used by health care professionals. The use of sucrose in neonates and infants has been shown to be an effective non-pharmacologic intervention for pain. Other non-pharmacological interventions, such as breastfeeding, non-nutritive sucking, distraction, and relaxation, were not identified as part of the interventions used to manage pain in this study. This lack of reference to the use of non-pharmacological interventions could either reflect a lack of knowledge about these modalities of intervention or the fact that the health care professionals did not recognize these as pain management techniques.

While a full discussion of the reasons behind inadequate treatment of pain is beyond the scope of this study, they are multifactorial, and for completeness are briefly mentioned. Knowledge barriers may exist among physicians and nurses regarding pain assessment, analgesic effectiveness and duration of action. Children receive substantially less analgesia than adults with similar conditions, suggesting that these barriers are even greater in children (40). For some, there may be cultural barriers or a cultural difference in pain behavior and expectation between staff and patients, which can contribute to both difficulty in pain assessment and inadequate dispensing of pain medication (41). Furthermore, preconceived notions held by staff about pain in certain patient groups may also influence pain management (42).

Limitations in this study included lack of accompanying measures of data accuracy for the older children, therefore potentially affecting outcomes especially in reporting severity of pain. Several behaviors associated with pain in preverbal children (Less than 3 years); such as grimacing and crying are not always unique to a painful experience. Therefore other causes for these activities i.e. Hunger, temperature control, wet diaper were considered and excluded where appropriate.

This study adds to the literature about pediatric pain in developing countries and, unfortunately, confirms similar results previously found in pain studies carried out in developed countries. These findings demonstrate the high prevalence and inadequate treatment of pain in a pediatric in-patient population.

CONCLUSION

Pain is common among hospitalized children at KNH general paediatric wards occurring in 78% of the participants most (71%) of whom experience mild to moderate pain.

Pain management is poor with only 50 % of patients in pain receive adequate analgesia.

RECOMMENDATION

1. Use of Pharmacologic (i.e. Topical analgesic creams/ spray) and non- pharmacologic interventions by the healthcare workers to reduce pain due to clinical procedures
2. Training of health care providers on appropriate use and proper dosing of analgesics in the paediatric population

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APPENDICES

I. CONSENT FORM

Study No.....

Hospital No.....

Study Title: PREVALENCE AND SEVERITY OF PAIN AMONG CHILDREN ADMITTED IN KNH GENERAL PAEDIATRIC WARDS.

Investigator: Dr Jane .W. Mate (Resident in Paediatrics and child Health)
Tel Number: - 0720-791485.

Supervisors: Prof. E. Maleche Obimbo

Dr Ahmed Laving

Dr Zipporah Vunoro Ali

Introduction: The purpose of this study is to estimate the prevalence and severity of pain among children admitted in the KNH general paediatric wards. This study also seeks to establish the initial pain management that these children receive while in the ward. Procedures to be undertaken in this study are:

- A structured questionnaire administered to the patient and/or guardian to establish prevalence of pain.
- Age appropriate pain scales to establish severity of pain.
 - FLACC (patients ages 1 month - 3 years).
 - FPS-R (Ages 4 - 12 years).
- A review of the patient's treatment sheet and nursing charts to establish the initial pain management administered to the patient.

The information gathered will be used to improve the pain management of children admitted in the general paediatric wards.

Risks: There will be no risks to you or your child during the study. There will be no invasive procedures carried out in the study that may harm your child. Refusal to participate will in no way jeopardize the treatment of your child in any way.

Voluntariness: The study will be fully voluntary. There will be no financial rewards to you for participating in the study. One is free to participate or withdraw from the study at any point. Refusal to participate will not compromise your child's care in any way.

Confidentiality: The information obtained about you, your child and your family will be kept in strict confidence. No specific information regarding you, your child or your family will be released to any person without your written permission. We will, however, discuss general overall findings regarding all children assessed but nothing specific will be discussed regarding your child's condition. We will also, not reveal the identity of you or your child in these discussions.

Problems or Questions: If you ever have any questions about the study or about the use of the results you can contact the principal investigator, *Dr Jane .W.Mate* on Tel No.0720-791485.

If you have any questions on your rights as a research participant you can contact the *Kenyatta National Hospital Ethics and Research Committee (KNH- ESRC)* by calling 2726300 Ext. 44355.

Ihaving received adequate information regarding the study research, risks hereby AGREE / DISAGREE (Cross out as appropriate) to participate/ for my child to participate in the study.

I understand that our participation is fully voluntary and that I am free to withdraw at any time. I have been given adequate opportunity to ask questions and seek clarification on the study and these have been addressed satisfactorily.

Participant /Guardian's Signature: Date.....

Ideclare that I have adequately explained to the above participant/ guardian, the study procedure, risk and given him /her time to ask questions and seek clarification regarding the study. I have answered all the questions raised to the best of my ability.

Investigator's Signature..... Date.....

II. Fomu ya Idhini.

Nambari ya Utafiti.....

Nambari ya Hospitali.....

SWALA KUU LA UTAFITI:

Kuchunguza kiasi cha watoto wanaoungua uchungu na kiasi cha uchungu katika watoto ambao wamelazwa kwa vyumba vya watoto katika hospitali kuu ya Kenyatta.

Mpelelezi mkuu: Dkt Jane .W. Mate
Department of Paediatrics and Child health.
University of Nairobi.

Wasaidizi wakuu: Prof.E. Maleche Obimbo
Dr Ahmed Laving
Dr Zipporah Vunoro Ali.

Lengo la utafiti huu ni kuweza kutambua kiasi cha watoto wanaoungua uchungu na kiasi cha uchungu kati ya watoto ambao wamelazwa kwa vyumba vya watoto katika hospitali kuu ya Kenyatta. Zaidi ni kuangalia aina ya matibabu ya uchungu ambayo watoto wanapatiwa wakiwa wamelazwa katika hospitali kuu ya Kenyatta.

Mgonjwa ama mlinzi atajibu maswali kuhusu uchungu wa mgonjwa aliyelazwa katika chumba cha watoto katika hospitali kuu ya Kenyatta.

Utafiti huu utatumia mbinu mbili za kuchunguza kiasi cha uchungu wa mgonjwa.

- FLACC kwa watoto wa; mwezi 1- miaka 3.
- FPS-R kwa watoto wa miaka 4 – 12.

Karatasi za matibabu za mgonjwa zitaangaliwa kuona kama mgonjwa amepata matibabu yoyote ya uchungu.

Umuhimu.

Umuhimu wa utafiti huu ni kuboresha uchunguzi na matibabu ya watoto wanaoungua uchungu wakati wamelazwa katika hospitali kuu ya Kenyatta.

Madhara na manufaa ya kushiriki:

Hakuna madhara yoyote ambayo yatatokana na utafiti huu kwa afya ya mtoto .Hakuna gharama yoyote zaidi itakayotokana kwa ajili ya kushiriki katika utafiti huu.

Baadaya utafiti hakuna malipo yoyote utakayopata bali shukrani kwa kukubali kushiriki katika utafiti huu.

Kushiriki kwa utafiti huu ni kwa hiari ya mgonjwa ama mlinzi na mgonjwa hawezi kushurutishwa. Mgonjwa atahudumiwa hata akitakataa kuhusika kwa utafiti huu. Mgonjwa ama mlinzi ana uhuru kutamatisha kuhusika wakati wowote bila madhara yoyote.Habari yoyote utakayotoa itawekwa kwa siri na jina la mgonjwa halitachapishwa popote.

Ikiwa ungetaka kupata maelezo zaidi, tafadhali wasilianana mpelelezi mkuu kupitia nambari ya simu:0720-791485 ama *hospitali kuu ya Kenyatta Department ya utafiti kwa nambari ifuatayo 0276300.*

Mimi.....nimeelewa maana na jinsi utafiti huu utakavyofanywa na nimepatiana idhini yangu/ ya mtoto wangu/mtoto nimemsimamia kushiriki.

Sahihi.....

Tarehe.....

Sahidi.....

Sahihi.....

III. QUESTIONNAIRE (4 – 12 YEARS)

STUDY TITLE:

PREVALENCE AND SEVERITY OF PAIN AMONG CHILDREN ADMITTED IN THE GENERAL PAEDIATRIC WARDS KENYATTA NATIONAL HOSPITAL.

CHILD'S SELF-REPORT OF PAIN (AGES 4 -12 YEARS).

1. Patient's Demographics.

Study Number:	
Age (Years):	
Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female	
Date/Time of Admission: Date/Time of Recruitment:	
<i>(As indicated in the patients File)</i> Clinical Diagnosis at admission: Differential Diagnosis:	

2. Have you felt any pain since admission until this moment? (Use as reference the last 24 h)

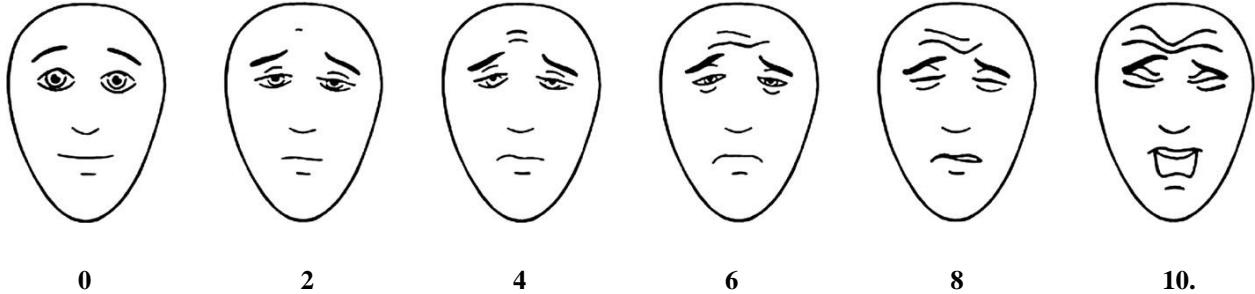
- Yes
- No

3. Was the pain associated with:

3.1. Admission diagnosis?

- Yes
- No (Skip to Question 3.2)

3.1.1. **If Yes, How severe was the Pain?** (Select one option on the pain scale below).



3.1.2. **Where did you feel the pain?**(Tick all applicable sections)

- Head & Neck
- Chest
- Abdomen
- Upper limbs
- Lower limbs
- Groin
- Buttocks.
- Other..... (Specify).

3.1.3. **Did you tell any healthcare worker that you felt pain?**

- Yes
- No.

3.1.4. **Whom did you tell?**

- Doctor.
- Nurse
- Clinical Officer.

3.1.5. **Did you receive any pain medication?**

- Yes
- No

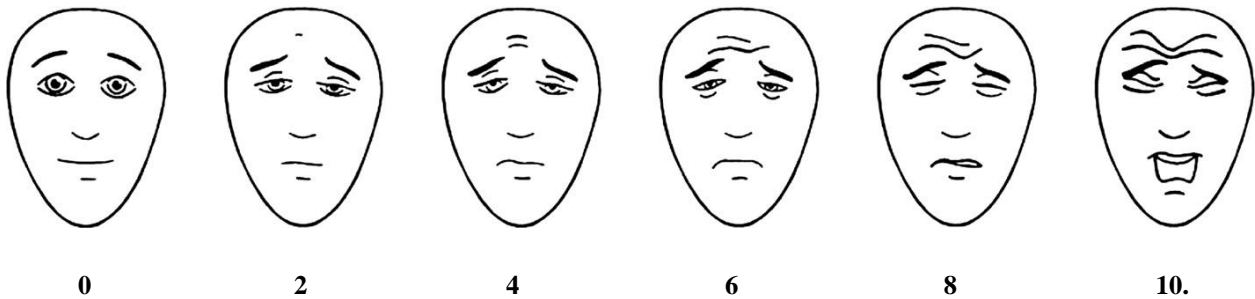
3.1.6. If pain Medication was provided, how often was it given?

- STAT Dose
- Once/Day
- 2-3 times/Day
- PRN

3.2. Procedure at emergency unit?

- Yes
- No (Skip to question 3.3.)

3.2.1. If Yes, How severe was the Pain?(Select one option on the pain scale below)



3.2.2. Where did you feel the pain? (Tick all applicable sections)

- Head & Neck
- Chest
- Abdomen
- Upper limbs
- Lower limbs
- Groin
- Buttocks.
- Other.....(Specify)

3.2.3. **Which invasive procedure(s) did you undergo in the emergency unit?** (Tick all applicable).

- Peripheral IV line insertion
- Central line Insertion
- Blood sample Collection.
- I.V/ I.M Injection
- Nasogastric tube Insertion.
- Lumbar puncture
- Insertion of urinary catheter
- Chest tube Insertion
- Bone Marrow Aspirate.
- Other..... (Specify).

3.2.4. **Was pain medication provided for any invasive procedure(s) done in the emergency unit?**

- Yes
- No.

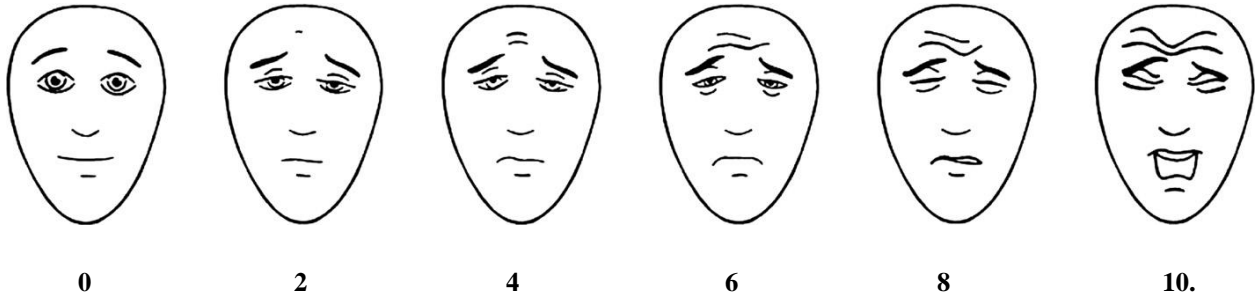
3.2.4.1. **If yes, for which invasive procedure was pain medication provided?**(Tick all applicable)

- Peripheral IV line insertion
- Central line Insertion
- Blood sample Collection.
- I.V/ I.M Injection
- Nasogastric tube Insertion.
- Lumbar puncture
- Insertion of urinary catheter
- Chest tube Insertion
- Bone Marrow Aspirate.
- Other..... (Specify).

3.3. **Procedure in the ward?**

- Yes
- No.

3.3.1. If Yes, How severe was the Pain? (Select one option on the Pain Scale below)



3.3.2. Where did you feel the pain? (Tick all applicable sections)

- Head & Neck
- Chest
- Abdomen.
- Upper limbs
- Lower limbs
- Groin
- Buttocks
- Other.....(Specify)

3.3.3. Which invasive Procedure(s) did you undergo in the ward? (Tick all applicable).

- Peripheral IV line insertion
- Central line Insertion
- Blood sample Collection.
- I.V/ I.M Injection
- Nasogastric tube Insertion.
- Lumbar puncture
- Insertion of urinary catheter
- Chest tube Insertion
- Bone Marrow Aspirate.
- Other.....(Specify)

3.3.4. Was pain medication provided for any invasive procedures done in the ward?

- Yes
- No.

3.3.4.1. If yes, for which invasive procedure was pain medication provided?(Tick all applicable)

- Peripheral IV line insertion
- Central line Insertion
- Blood sample Collection.
- I.V/ I.M Injection
- Nasogastric tube Insertion.
- Lumbar puncture
- Insertion of urinary catheter
- Chest tube Insertion
- Bone Marrow Aspirate.
- Other..... (Specify).

3.3.5. Did you tell health care worker in the ward that you felt pain?

- Yes
- No.

3.3.6. Whom did you tell?

- Doctor.
- Nurse
- Clinical Officer.

3.3.7. Did you receive any pain medication?

- Yes
- No.

3.3.8. If pain Medication was provided, how often was it given?

- STAT Dose
- Once/Day
- 2-3 times/Day
- PRN.

PRIMARY CAREGIVERS' REPORT OF CHILD'S PAIN (AGES 4-12 YEARS).

1. Primary Caregiver:

- Mother
- Father
- Other.....(Specify).

1.1. Caregiver's Demographics.

Age:

Sex:

Level of Education:

Occupation:

- | | |
|---|---|
| <input type="checkbox"/> No Education | <input type="checkbox"/> Non-working/house wife |
| <input type="checkbox"/> Primary(Incomplete) | <input type="checkbox"/> Unskilled manual worker |
| <input type="checkbox"/> Primary(Complete) | <input type="checkbox"/> Skilled manual worker/farmer |
| <input type="checkbox"/> Secondary (Incomplete) | <input type="checkbox"/> Trades/business |
| <input type="checkbox"/> Secondary(Complete) | <input type="checkbox"/> Semi-professional/clerk |
| <input type="checkbox"/> University graduate | <input type="checkbox"/> Professional |
| <input type="checkbox"/> Postgraduate degree | |

2. Has the child felt pain since admission?

- Yes
- No.

2.1. If yes, how did you know that the patient suffered pain?

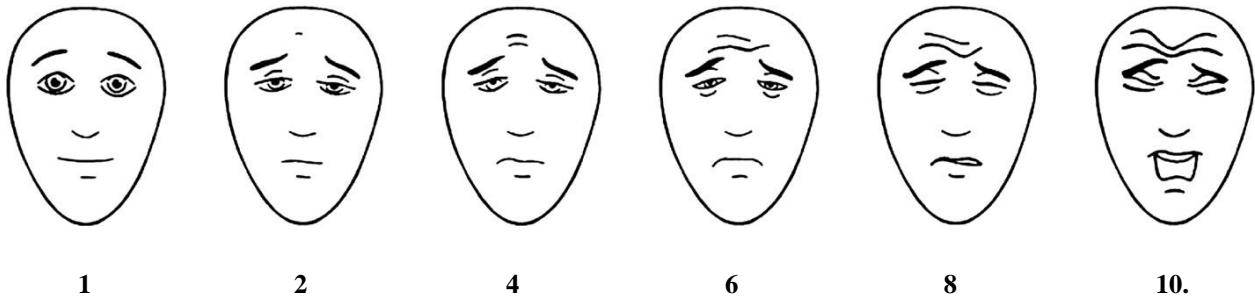
- Child reported their pain.
- Child was crying.
- Child holding the painful area.
- Child was irritable
- Refused to feed
- Other.

3. Was the pain associated with:

3.1. Admission diagnosis?

- Yes.
- No (Skip to Question 3.2)

3.1.1. If Yes, How severe was the Pain? (Select one option on the pain scale below).



3.1.2. Where did the patient feel the pain? (Tick all applicable sections)

- Head & Neck
- Chest
- Abdomen
- Upper limbs
- Lower limbs
- Groin
- Buttocks.
- Other..... (Specify).

3.1.3. Did you tell any healthcare worker that the patient felt pain?

- Yes
- No

3.1.4. Whom did you tell?

- Doctor.
- Nurse
- Clinical Officer.

3.1.5. Did the patient receive any pain medication?

- Yes
- No.

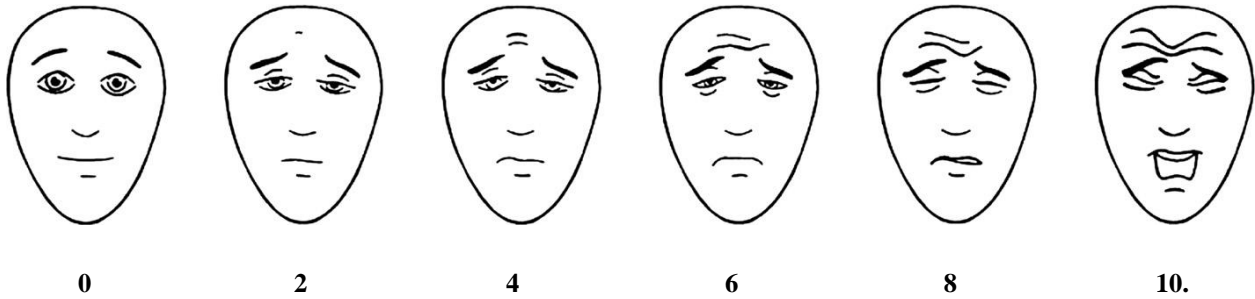
3.1.6. If Pain medication was provided, how often was it given?

- STAT Dose
- Once/Day
- 2-3 times/Day
- PRN.

3.2. Procedure at emergency unit?

- Yes
- No (Skip to question 3.3.)

3.2.1. If Yes, How severe was the Pain?(Select one option on the pain scale below)



3.2.2. Where did the patient feel the pain? (Tick all applicable sections)

- Head & Neck
- Chest
- Abdomen
- Upper limbs
- Lower limbs
- Groin
- Buttocks.
- Other.....(Specify)

3.2.3. Which invasive procedure(s) did the patient undergo in the emergency unit? (Tick all applicable).

- Peripheral IV line insertion
- Central line Insertion
- Blood sample Collection.
- I.V/ I.M Injection
- Nasogastric tube Insertion.
- Lumbar puncture
- Insertion of urinary catheter
- Chest tube Insertion
- Bone Marrow Aspirate.
- Other..... (Specify).

3.2.4. Was pain medication provided for any invasive procedures done in the emergency unit?

- Yes
- No.

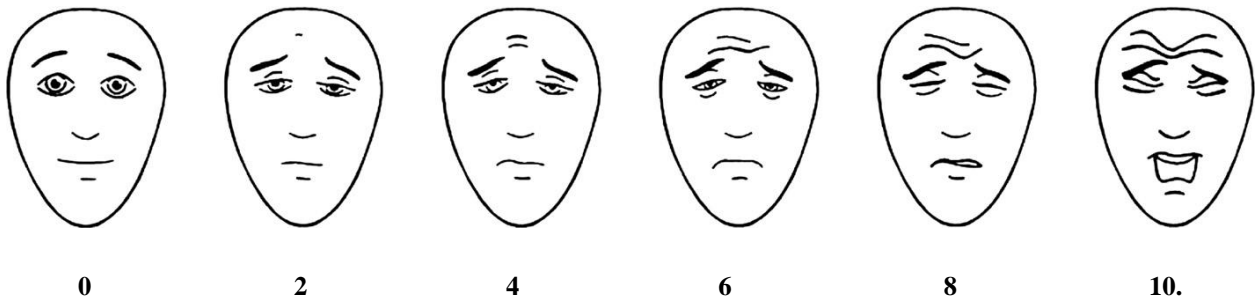
3.2.4.1. If yes, for which invasive procedure(s) was pain medication provided?

- Peripheral IV line insertion
- Central line Insertion
- Blood sample Collection.
- I.V/ I.M Injection
- Nasogastric tube Insertion.
- Lumbar puncture
- Insertion of urinary catheter
- Chest tube Insertion
- Bone Marrow Aspirate.
- Other..... (Specify).

3.3. Procedure in the ward?

- Yes
- No

3.3.1. If Yes, How severe was the Pain? (Select one option on the Pain Scale below)



3.3.2. Where did the patient feel the pain? (Tick all applicable sections)

- Head & Neck
- Chest
- Abdomen
- Upper limbs
- Lower limbs
- Groin
- Buttocks
- Other.....(Specify)

3.3.3. Which invasive Procedure(s) did the patient undergo in the ward? (Tick all applicable)

- Peripheral IV line insertion
- Central line Insertion
- Blood sample Collection.
- I.V/ I.M Injection
- Nasogastric tube Insertion.
- Lumbar puncture
- Insertion of urinary catheter
- Chest tube Insertion
- Bone Marrow Aspirate.
- Other..... (Specify).

3.3.4. Was pain medication provided for any invasive procedures done in the ward?

- Yes
- No

3.3.4.1. If yes, for which invasive procedure was pain medication provided?

- Peripheral IV line insertion
- Central line Insertion
- Blood sample Collection.
- I.V/ I.M Injection
- Nasogastric tube Insertion.
- Lumbar puncture
- Insertion of urinary catheter
- Chest tube Insertion
- Bone Marrow Aspirate.
- Other..... (Specify).

3.3.5. Did you tell any healthcare worker in the ward that the patient felt pain?

- Yes
- No

3.3.6. Whom did you tell?

- Doctor.
- Nurse
- Clinical Officer.

3.3.7. Did the patient receive any pain medication?

- Yes
- No.

3.3.8. If pain Medication was provided, how often was it given?

- STAT Dose
- Once/Day
- 2-3 times/Day
- PRN.

TREATMENT SHEET AND NURSE CHART/RECORDS ANALYSIS.

1. Is there any record on pain management on the patient’s treatment sheet?

- Yes
- No

1.1. If yes, what kind of prescription was made?

- Pharmacological prescription.
- Non-Pharmacological prescription.
- Other.....(Specify)

1.2. For a pharmacologic prescription fill in the table below.

	Patients Age	Patients Weight	Name of Drug prescribed	Dose	Route	Frequency	(To be filled by P.I)	
							Under-dose	Over-dose
1.								
2.								
3.								

2. Is there any record on administration of pain medication in the patient’s treatment sheet/ nurse’s chart?

- Yes
- No

2.1. If yes, fill in the table below

	Patients Age	Patients Weight	Name of Drug prescribed	Dose	Route	Frequency	(To be filled by P.I)	
							Under-dose	Over-dose
1.								
2.								
3.								

PAIN MANAGEMENT INDEX, (To be done by the primary investigator)

✚ The PMI =Analgesic score- pain scores.

1. Indicate patient’s pain score below.

- 0 = No pain,
- 1= Mild pain,
- 2= Moderate pain,
- 3= Severe pain.

2. Indicate patient’s analgesic score.

- 0 = no analgesic
- 1 = WHO I (non-opioid analgesia)
- 2 = WHO II (weak opioid) ,
- 3 = WHO III (strong opioid)

3. Calculate patient’s PMI

- Negative score = Under-treatment
- Positive treatment = Adequate Management.

IV. QUESTIONNAIRE 1 MONTH - 47 MONTHS

STUDY TITLE:

PREVALENCE AND SEVERITY OF PAIN AMONG CHILDREN ADMITTED IN THE GENERAL PAEDIATRIC WARDS KENYATTA NATIONAL HOSPITAL.

SURVEILLANCE OFFICER’S EVALUATION OF PAIN (AGES 1 MONTH - 3 YEARS).

1. Patient’s Demographics.

Study Number:	
Age (Months):	
Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female	
Date/Time of Admission: Date/Time of Recruitment:	
<i>(As indicated in the patients File)</i> Admission Diagnosis: Differential Diagnosis:	

2. Is the patient currently in Pain/Discomfort?

- Yes
- No

2.1. Use the scale below to determine the severity of the patient’s pain.

Faces, Legs, Activity, Crying, Consolability (FLACC) Scale. *(To be conducted by surveillance officer.)*

	0	1	2	Score
Face	No particular expression or smile	Occasional grimace or frown; Withdrawn, Disinterested.	Frequent to constant frown, Clenched jaw, Quivering chin.	
Legs	Normal position or relaxed	Uneasy, Restless, Tense	Kicking or legs drawn up.	
Activity	Lying quietly, Normal position, moves easily	Squirming, shifting back and forth, Tense	Arched, Rigid or jerking.	
Crying	No cry (Awake or asleep)	Moans or whimper Occasional complaint.	Crying steadily, Screams or sobs; Frequent complaints	
Consolability	Content, Relaxed	Reassured by occasional touching, hugging or being talked to; distractible.	Difficult to console or comfort	
TOTAL SCORE				

PARENTS/CAREGIVERS’ REPORT OF CHILD’S PAIN (AGES 1 MONTH - 3 YEARS).

1. Primary Caregiver:

- Mother
- Father
- Other..... (Specify).

1.1. Caregiver’s Demographics.

Age:

Sex:

Level of Education:

- No Education
- Primary(Incomplete)
- Primary(Complete)
- Secondary (Incomplete)
- Secondary(Complete)
- University graduate
- Postgraduate degree

Occupation:

- Non-working/house wife
- Unskilled manual worker
- Skilled manual worker/farmer
- Trades/business
- Semi-professional/clerk
- Professional

2. Has the child experienced any pain since admission?

- Yes
- No

2.2. If yes, how did you know that the child was in pain?

- Child was crying.
- Child reported their pain.
- Child holding the painful area.
- Child was irritable
- Refused to feed
- Other.

3. Was the pain associated with:

3.1. Admission diagnosis?

- Yes.
- No (Skip to Question 3.2)

3.1.1. Where did the patient feel the pain? (Tick all applicable sections)

- Head & Neck
- Chest
- Abdomen
- Upper limbs
- Lower limbs
- Groin
- Buttocks.
- Other..... (Specify)

3.1.2. Did you tell any healthcare worker that the patient felt pain?

- Yes
- No

3.1.3. Whom did you tell?

- Doctor.
- Nurse
- Clinical Officer

3.1.4. Did the patient receive any pain medication?

- Yes
- No.

3.1.5. If Pain medication was provided, how often was it given?

- STAT Dose
- Once/Day
- 2-3 times/Day
- PRN

3.2. Procedure at emergency unit?

- Yes
- No (Skip to question 3.3)

3.2.1. Where did the patient feel the pain? (Tick all applicable sections)

- Head & Neck
- Chest
- Abdomen
- Upper limbs
- Lower limbs
- Groin
- Buttocks.
- Other.....(Specify)

3.2.2. Which invasive procedure(s) did the patient undergo in the emergency unit? (Tick all applicable).

- Peripheral IV line insertion
- Central line Insertion
- Blood sample Collection.
- I.V/ I.M Injection
- Nasogastric tube Insertion.
- Lumbar puncture
- Insertion of urinary catheter
- Chest tube Insertion
- Bone Marrow Aspirate.
- Other..... (Specify).

3.2.3. Was pain medication provided for any procedure done in the emergency unit?

- Yes
- No.

3.2.3.1 If yes, for which invasive procedure(s) was pain medication provided?

- Peripheral IV line insertion
- Central line Insertion
- Blood sample Collection.
- I.V/ I.M Injection
- Nasogastric tube Insertion.
- Lumbar puncture
- Insertion of urinary catheter
- Chest tube Insertion
- Bone Marrow Aspirate.
- Other..... (Specify).

3.3. Procedure in the ward?

- Yes
- No

3.3.1. Where did the patient feel the pain? (Tick all applicable sections)

- Head & Neck
- Chest
- Abdomen
- Upper limbs
- Lower limbs
- Groin
- Buttocks
- Other.....(Specify).

3.3.2. **Which invasive Procedure(s) did the patient undergo in the ward?** (Tick all applicable)

- Peripheral IV line insertion
- Central line Insertion
- Blood sample Collection.
- I.V/ I.M Injection
- Nasogastric tube Insertion.
- Lumbar puncture
- Insertion of urinary catheter
- Chest tube Insertion
- Bone Marrow Aspirate.
- Other.....(Specify)

3.3.3. **Was pain medication provided for any invasive procedures done in the ward?**

- Yes
- No.

3.3.3.1 **If yes, for which invasive procedure(s) was pain medication provided?**

- Peripheral IV line insertion
- Central line Insertion
- Blood sample Collection.
- I.V/ I.M Injection
- Nasogastric tube Insertion.
- Lumbar puncture
- Insertion of urinary catheter
- Chest tube Insertion
- Bone Marrow Aspirate.*
- Other..... (Specify).*

3.3.4. **Did you tell any health care worker that the patient felt pain?**

- Yes
- No

3.3.5. Whom did you tell?

- Doctor.
- Nurse
- Clinical Officer.

3.3.6. Did the patient receive any pain medication?

- Yes.
- No.

3.3.7. If pain Medication was provided, how often was it given?

- STAT Dose
- Once/Day
- 2-3 times/Day
- PRN.

TREATMENT SHEET AND NURSE CHART/RECORDS ANALYSIS.

1. Is there any record on pain management on the patient's treatment sheet?

- Yes
- No

1.1. If yes, what kind of prescription was made?

- Pharmacological prescription.
- Non-Pharmacological prescription..... (Specify)
- Other.....(Specify)

1.2 For a pharmacologic prescription fill in the table below.

	Patients Age	Patients Weight	Name of Drug prescribed	Dose	Route	Frequency	(To be filled by P.I)	
							Under-dose	Over-dose
1.								
2.								
3.								

2. Is there any record on administration of pain medication in the patient's treatment sheet/ nurse's chart?

- Yes
- No

2.1. If yes, fill in the table below

	Patients Age	Patients Weight	Name of Drug prescribed	Dose	Route	Frequency	(To be filled by P.I)	
							Under-dose	Over-dose
1.								
2.								
3.								

PAIN MANAGEMENT INDEX *(To be done by the primary investigator)*

✚ The PMI =Analgesic score- pain scores.

1. Indicate patient's pain score below.

- 0 = No pain,
- 1= Mild pain,
- 2= Moderate pain,
- 3= Severe pain.

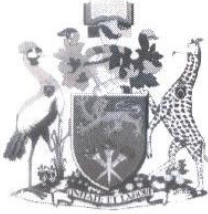
2. Indicate patient's analgesic score.

- 0 = no analgesic
- 1 = WHO I (non-opioid analgesia)
- 2 = WHO II (weak opioid) ,
- 3 = WHO III (strong opioid)

3. Calculate patient's PMI

- Negative score = Under-treatment
- Positive treatment = Adequate Management.

V. LETTER OF APPROVAL



UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
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(254-020) 2726300 Ext 44355

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



KENYATTA NATIONAL HOSPITAL
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Telegrams: MEDSUP, Nairobi

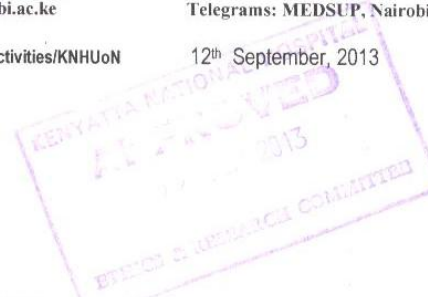
Ref: KNH-ERC/A/279

Link: www.uonbi.ac.ke/activities/KNHUoN

12th September, 2013

Dr. Jane Mate
Dept. of Paediatrics & Child Health
School of Medicine
University of Nairobi

Dear Dr. Mate



RESEARCH PROPOSAL: PREVALENCE AND SEVERITY OF PAIN AMONG CHILDREN ADMITTED IN KENYATTA NATIONAL HOSPITAL GENERAL PAEDIATRIC WARDS (P299/5/2013)

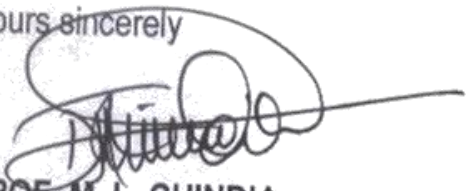
This is to inform you that the KNH/UoN-Ethics & Research Committee (KNH/UoN-ERC) has reviewed and **approved** your above proposal. The approval periods are 12th September, 2013 to 11th September 2014.

This approval is subject to compliance with the following requirements:

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

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

Yours sincerely



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

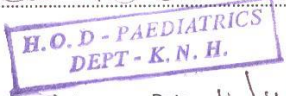
- c.c. Prof. A.N. Guantai, Chairperson, KNH/UoN-ERC
The Deputy Director CS, KNH
The Principal, College of Health Sciences, UoN
The Dean, School of Medicine, UoN
AD/Health Information, KNH
Supervisors: Dr. Elizabeth Maleche, Dr. Ahmed Laving, Dr.Zipporah V. Ali

VI. Study Registration Certificate



KENYATTA NATIONAL HOSPITAL
 Hospital Rd. along, Ngong Rd.
 P.O. Box 20723, Nairobi.
 Tel: 2726300-9 Fax: 2725272
 Research & Programs: Ext. 44705
 Email: k.research@knh.or.ke

Study Registration Certificate

1. Name of the PI DR STANE KIAGUTHI MATE
2. Email address: stanemate@knh.or.ke Tel No. 070791485
3. Contact person (if different from PI).....
4. Email address: Tel No.
5. Study Title
PREVALENCE AND SEVERITY OF PAIN AMONG CHILDREN
ADMITTED IN THE KENYATTA NATIONAL HOSPITAL.
GENERAL PAEDIATRIC WARDS
6. Department where the study will be conducted PAEDIATRICS AND CHILD HEALTH
7. Endorsed by Head of Department where study conducted
 Name: D. J. Mwangi Signature: [Signature] Date: 4/11/13

8. KNH UoN Ethics Research Committee approval number P299/5/2013
 (Please attach copy of ERC approval)
9. I DR STANE KIAGUTHI MATE commit to submit a report of my study findings to the Department where the study will be conducted and to the Department of Research and Programs.
 Signature: [Signature] Date: 08/10/2013
 Endorsed by Chair Department (only for students) of Paeds & CH
 Signature: [Signature] Date: 21.11.13
10. Study Registration number (Dept/Number/Year) PAEDS / 06 / 2013
 (To be completed by Research and Programs Department)

11. Research and Program Stamp _____



All studies conducted at Kenyatta National Hospital **must** be registered with the Department of Research and Programs and investigators **must commit** to share results with the hospital.