

**UTILIZATION OF PAIN RATING SCALES IN
PEDIATRIC CARE AMONG HEALTH
PROFESSIONALS AT GERTRUDE'S CHILDREN'S
HOSPITAL**

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**Utilization of Pain Rating Scales in Pediatric Care among Health
Professionals at Gertrude's Children's Hospital**

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Technology**

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other university

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DEDICATION

To my family and my parents, you awakened the “sleeping giant” in me.

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I express my sincere gratitude to God my maker for wisdom and strength he provided me with, throughout this process. Glory and honor be to His Holy name forever.

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ABBREVIATIONS AND ACRONYMS

APGAR: Appearance, Pulse, Grimace, Activity, Respiration.

CHC: Child Health Care.

CME: Continuous Medical Education.

FLACC: Face, Legs, Activity, Crying and Consolability.

FPS_R: Revised, Faces Pain Scale.

GST: General System Theory.

HDU: Highly Dependent Unit.

HCP: Health Care Providers.

ICU: Intensive Care Unit.

KII: Key Informant Interview.

KNH: Kenyatta National Hospital.

NPS: Numeric Pain Scales.

PMI: Pain Management Index.

PRS: Pain Rating Scales.

PIPP: Premature Infants Pain Profile.

VAS: Visual Analogue Scales.

OPERATIONAL DEFINITION

Adolescent	Individual in the 10-19 years age group (WHO, 2021).
Analgesia:	Absence of pain in response to stimulation that would normally be painful (Mate, 2014).
Health Care provider	: Health professional (Zahra, 2015).
Health Professionals	This refers to qualified health care providers (Zahra,2015).
Infants	Babies from 4weeks to 1 year old (Beltramini, 2017).
Key informant	Person with knowledge about a topic of interest (Pact, 2014).
Neonates	Babies from birth up to 4 weeks of age (Khasay, 2017).
Pain	An unpleasant sensory and emotional experience associated with actual or potential tissue damage (Mate, 2014).
Pain Intensity	The degree of pain severity (Gregory & Richardson, 2014).
Pain Rating Scales	Tools used for assessing and measuring/rating pain intensity (Chiaretti, 2013).
Preschool children	Children aged 5-9years (Twycross, 2017).
School going children	: Children aged 9-12years (Twycross, 2017).
Toddlers	Children aged 1- 4 years (Beltramini, 2017)

ABSTRACT

Pain is the most common stimuli experienced by pediatric patients. It is mainly managed based on the intensity which is determined through utilization of pain rating scales. Utilization of pain measurement tools in pediatric care is vital because they indicate the level and intensity of pain in the patients. The purpose of the study was to assess utilization of pain rating scales at Gertrude's children's hospital as a basis for making recommendation for their adoption by the Ministry of Health, Kenya. The study employed descriptive cross-sectional study design utilizing both quantitative and qualitative approaches. It was conducted at Gertrude's children's hospital in Nairobi-Kenya. The study population comprised health professionals working at the hospital and patients' medical records. Data were collected using semi-structured self-administered questionnaire, key informant interview guide (KII) and observation check list from a sample size of 160 Health Professionals, five key informants and 71 patients' medical records. Quantitative data was analyzed using descriptive statistics whereby data was summarized using frequency tables and presented using pie chart, and bar graphs. Content analysis was performed on qualitative data using inductive approach. The study revealed that the hospital has adopted four pain rating scales which included Neonatal Guide Score, FLACC, Wong Baker faces scale, and Numerical pain scale. These tools were utilized by the Health Professionals at the hospital with nurses being the main Health Professionals who utilized them. Health system factors which included staff training, protocols on pain management and frequent auditing supported their utilization. Being newly employed and use of FLACC in cognitively challenged patients were the main challenges in utilization of pain rating scales at the hospital. Nurses were the main Health Professionals who utilized pain rating scales at the hospital. Staff training, protocols on pain management and frequent auditing improved their utilization. Inclusion of pain assessment in the curriculum for all institutions training health professionals may address the challenge posed by the newly employed health professionals in utilization of pain rating scales. Further research on validity of FLACC in mentally challenged patients may be necessary in this setting.

CHAPTER ONE

INTRODUCTION

1.1 Back Ground of the Study

Pain rating scales are vital tools in pediatric care for diagnosis and management of pain in pediatric patients. These scales are important diagnostic tools used by healthcare providers to evaluate the nature and severity of pain experienced by pediatric patients. In children, selection of appropriate pain rating scales is important because pain is expressed in different ways depending on the developmental stage of the child (Beltramini et al., 2017). Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. In pediatric population, any provocative event that may trigger a memory of past painful experience causes “pain”. It is the most common stimuli experienced by pediatric patients, and its management mainly depends on utilization of pain rating scales in assessment and measurement of its intensity (Mate, 2014). Even though pain assessment tools should be reliable, valid, developmentally appropriate, clinically useful and practical to use, literature review has shown that no single tool has been identified as ideal despite development of over 40 pain assessment tools (Dick et al., 2016).

Globally, pain rating scales have been adopted for use in child health care and policy on the same has been implemented. Documented literature shows that in the developed countries these tools are being utilized and their utilization has helped in improvement of pain management in children (Kahsay, 2017). However a study done by Bonnie et al., (2012), in a Canadian pediatric hospital to determine the frequency of pain assessment in admitted children revealed that pain rating scales were not frequently used in some of the pediatric patients. Other documented outcome associated with utilization of pain rating scales in children include minimized admission and reduced cost of hospitalization (Uwaezu, 2014).

In sub-Saharan Africa, most hospitals do not have pain rating scales for utilization in pediatric patients (Walters, 2009). In these hospitals, routine pain assessment for pediatric patients has been hindered by lack of a single-item pain rating scale

validated for measuring pain intensity (Huang et al., 2012). A documented commentary on Queen Elizabeth Central Hospital in Blantyre, Malawi revealed that the hospital did not have a single pain rating scale for assessing pain in pediatric patients and that pain assessment was not being done (Walters, 2009).

In Kenya, though most hospitals have not adopted a single pain rating scale in child health care, such tools have been adopted in oncology and palliative clinics in some hospitals. As a result, management of chronic pain in patients attending such clinics has been improved and their comfort enhanced (Kristin et al., 2013). The fact that pain is considered “the fifth vital sign”, it should be assessed and recorded frequently as other vital signs, in the observation sheet. However, assessment and measurement of pain in pediatric patients has been a challenge not only in developing countries but also in developed world. This is due to limited resources and skills (Mate, 2014). Though knowledge on pain rating scales and their utilization can greatly improve the outcome of pain management, health care providers are not trained in school on pain rating scales (Zahra, 2015). At Gertrude’s children’s hospital, pain rating scales have been adopted, for assessment and measurement of pain in pediatric patients.

1.2 Statement of the Problem

Pain has been reported in hospitalized children despite the availability of improved pain-assessment tools (Friedrichsdorf et al., 2016). Documented literature indicates that, pain experienced in hospitalized children is known to be common, under-recognized, and under-treated, with more than 10% of hospitalized children showing features of chronic pain (Friedrichsdorf et al., 2016). In the States of America the prevalence of moderate-to-severe pain in hospitalized children has been reported to be between 25% and 64%. (Ternullo & DiAntonio, 2015). Pain is often inadequately assessed and treated, especially in the African setting, where resources and skills are limited (Mate, 2014). Inadequate treatment of pain in pediatric patients has immensely contributed to prolonged hospital stay for admitted children (Uwaezu, 2014).

Not only are pediatric patients vulnerable to inadequate pain treatment, but they are also at risk of experiencing negative consequences resulting from poor pain control

(Hauer, 2017). According to Walters (2018), if a child's pain is not treated quickly and effectively, it can have long-term physical and psychological sequelae. Literature has shown that poorly controlled pain can reduce patients' quality of life. Pediatric patients may become depressed or anxious and sometimes unable to do many of the things they did without pain (Walters, 2018). This state of living in pain has affected relationship between children and other family members. The other undesired effects, of uncontrolled pain include prolonged hospital stay and increased cost of treatment (Uwaezu, 2014).

In Kenyan hospitals, pain in hospitalized children remains undertreated. The prevalence of pain has remained high especially among cancer and HIV/AIDS patients with prevalence of 59% to 98% (Kristin et al., 2013). Besides, assessment and measurement of pain is never done in most of the hospitals in Kenya, as they lack a single pain rating scale. The few hospitals with such tools, utilize them mostly in palliative departments. Pain is a cause of mortality among the paediatric patients, yet the issue of pain assessment and measurement in paediatric patients has not been captured in the basic paediatric protocol by the Ministry of Health Kenya. Though it has guidelines targeting management of the seriously ill new born or child in the first 24 - 48 hours of arrival at hospital, it has failed to capture the assessment and measurement of pain in such patients as a principle of good paediatric care. The prescribed analgesic dosages in the protocol most of the time is not used properly by the health professionals in pain management because there is no guideline on "who and when to be given what". This has left the health care professionals with an "option" of treating pain based on their own perception rather than the exact level of pain in the patients(Kristin et al., 2013).

1.3 Justification

Pain rating scales are important clinical tools in treatment and management of pain in pediatric patients. Although pain is subjective and specific to each pediatric patient, it can be accurately assessed and measured using pain rating scales (Twycross, 2017). According to Uwaezu (2014), pain in pediatric patients has remained an "issue" despite the use of prescribed analgesics. Parents have reported of pain in their

sick children despite the use of prescribed analgesics. The fact that pain in children has persisted regardless of analgesic use, necessitated the need for this study.

Utilization of pain rating scales in pediatric patients has helped in improving pain management and has extended survival of some patients (Brand and Al-Rais, 2019). Adequate assessment and measurement of pain in pediatric patients, can improve comfort in ill children and avoid inadequate pain treatment. Simple pain measurements methods can improve pain relief in children. It can also create a common language and an adequate communication among healthcare professionals (Uwaezu, 2014).

Findings from this study may be useful in improving pain assessment and management in pediatric patients. It may also act as a guide for hospitals which have not yet adopted pain rating scales in pediatric care, and may wish to adopt these important tools. Awareness on pain rating scales (PRS) in child health care among the health care providers will be increased by reading the published information on this study. Besides, literature for use by other scholars has been availed through publication of this study. Gertrude's children's hospital was selected for the study because it is the largest pediatric hospital in Kenya with ideal pediatric care and it has adopted PRS in pediatric care. Therefore the purpose of this study was to assess utilization of pain rating scales at Gertrude's children's hospital as a basis for making recommendation for their adoption by the Ministry of Health, Kenya.

1.4 Research Questions

1. What is the level of utilization of pain rating scales in pediatric care among health professionals at Gertrude's children's hospital?
2. What is the perception of the health professionals on importance of use of pain rating scales in measurement of pain in pediatric care at Gertrude's children's hospital?
3. What are the health system factors supporting the utilization of pain rating scales in pediatric care among health professionals at Gertrude's children hospital?

4. What are the challenges experienced by health professionals in the utilization of pain rating scales in pediatric care at Gertrude's children's hospital?

1.5 Study Objectives

1.5.1 Broad Objective

To assess the utilization of pain rating scales in pediatric care among health professionals at Gertrude's children's hospital.

1.5.2 Specific Objectives

1. To determine the level of utilization of pain rating scales in pediatric care among health professionals at Gertrude's children's hospital.
2. To establish the perception of health professionals on the importance of use of pain rating scales in measurement of pain in pediatric care at Gertrude's children's hospital.
3. To determine health system factors supporting the utilization of pain rating scales in pediatric care among health professionals at Gertrude's children's hospital.
4. To determine the challenges experienced by health professionals in the utilization of pain rating scales in pediatric care at Gertrude's children's hospital.

1.6 Theoretical Frame Work

This study was anchored on general system theory (GST), because of its ability to show the relationship between the study variables. General system theory was developed by Ludwig Bertalanffy in 1950 with a view of integrating various sciences (Charissa, 2013). He emphasized on the importance of viewing system as "whole" which is made up of different units/parts. These parts are interrelated to make the "whole" and they have unifying factors which makes it possible for the "whole" to function. A part does not work in isolation but it work in unity with other parts to achieve the goal of making the system function. However, in case of malfunction of any part, the whole system becomes non - functional(Charissa, 2013).

Ludwig viewed system in “wholeness” rather than in different parts. He described systems in different classes such as open systems, closed systems, simple systems and complex systems. According to Ludwig, open system is the system that has interaction with the environment; closed system is the system that does not interact with the environment (isolated). Simple system is the system without complexity while complex system may be made up of both the open and closed systems. General system theory (GST) has three contexts which Ludwig describes as input, throughput and output. According to him every system has input which may be taken to mean “raw materials”. Input must be processed (through put) to get the end product (output). In this study, general system theory has been used to show the relationship between the health provider characteristics (input), health system factors (throughput) and utilization/non-utilization of pain rating scales (output) in pediatric care among the health professionals at Gertrude’s children’s hospital.

1.7 Conceptual Framework

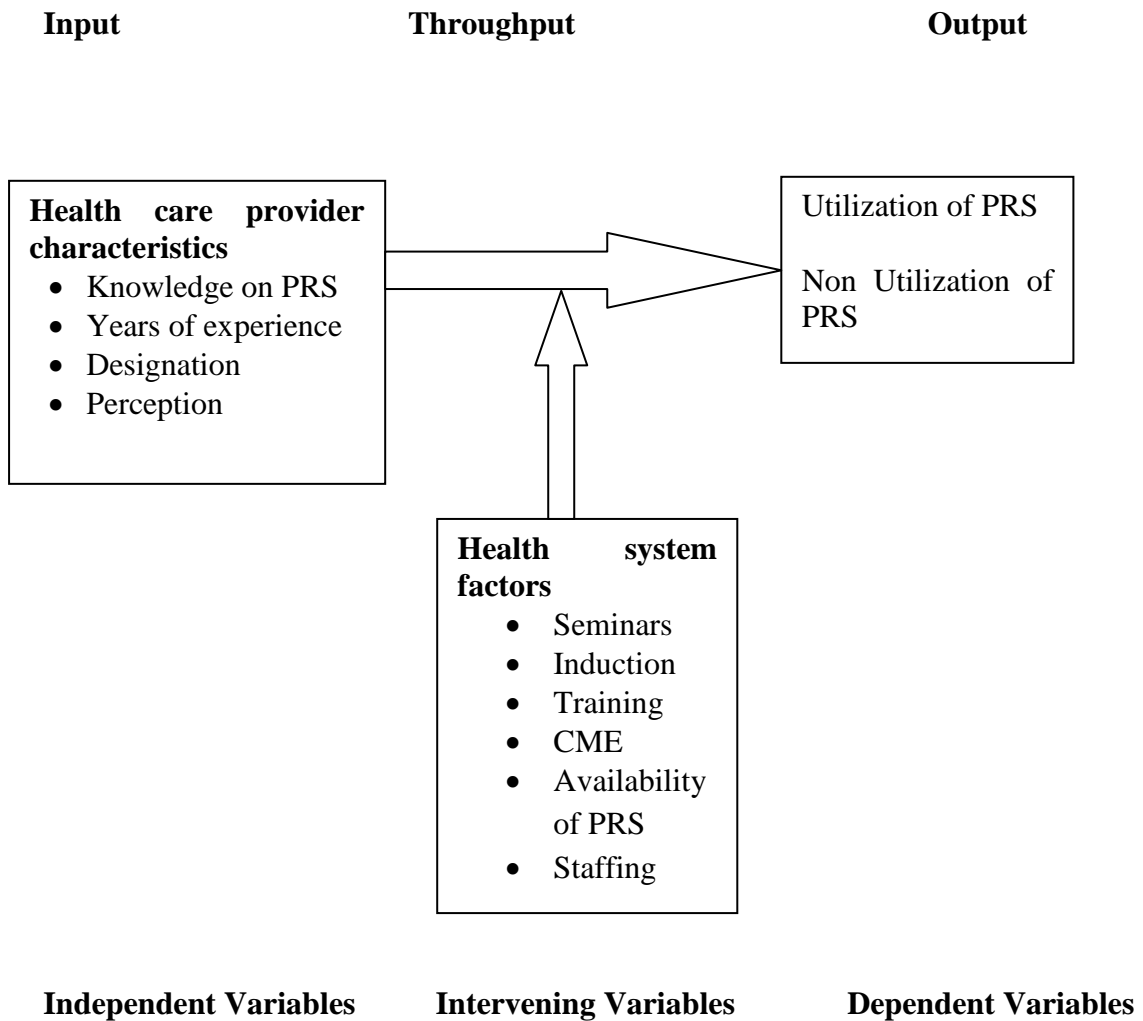


Figure 1.1: Factors influencing the utilization of pain rating scales.

Utilization or non-utilization of pain rating scales in pediatric care will depend on health care provider characteristics. However, it can also be supported by health system factors like induction of the staffs, seminars, training availability of pain rating scales and staffing.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Pain management in child health care is vital and can be enhanced through utilization of pain rating scales. It requires health care providers to have knowledge on these scales and utilize them appropriately in assessment and measurement of pain intensity among the pediatric patients. Other factors that can influence utilization of pain measurement tools include health system factors such as training and continuous medical education. Pain rating scales can act as a communication tool between patients and health care providers. This is because it communicates the severity of pain to health care team, and also allows them to assess the effect of medications (O'Brien, Schwartz, & Plattner, 2018).

This review focused on description of pediatric pain rating scales, their utilization, and factors influencing their utilization among health professionals. Though both health care provider factors and health system factors may influence utilization of pain rating scales, this study mainly focused on health system factors. Most sources have revealed adequate utilization of pain rating scales. It is also noted that, health care provider factors have been identified as the most cause of non - utilization of pain rating scales among health professionals. However, no much information is available in literature on health system factors that influence the utilization of pain rating scales in pediatric care among health professionals. Review has also shown that most hospitals in the developed countries are utilizing PRS in child health care depending on their practicability, and documentation of the same has been done (Brand & Thorpe, 2016).

2.2 Paediatric Pain Rating Scales

Though pain rating scales in children are numerous and are chosen basically based on the age appropriateness and developmental stage of the child, rating of pediatric pain should be done using appropriate and valid tools (Ogston-Tuck, 2014). Tsze et

al. (2013) observed that two commonly used pain rating scales in child health care are the Visual Analog Scale and Faces Pain Scale–Revised. The FPS-R has 6 faces with each face representing increasing pain severity, such that the right face is more severe than the left face (Mate, 2014).

In the VAS, children rate pain intensity on a 10 cm line. One end of the line is labeled “no pain” and the other end “severe pain” (Albertyn et al., 2012). Chiaretti et al. (2013), noted that scores are obtained by taking measurement of the distance between the end that reads “no pain” and the area that is marked by the patient. The measurement is usually taken in millimeters. According to Beltramini et al. (2017) VAS has many advantages and disadvantages. Some of the advantages include simplicity in scoring, because it provides many measuring points and it also avoids imprecise descriptive terms, while the disadvantage include the need for concentration and coordination hence making it difficult to use in patients who are post-operated or in those with neurological conditions.

Documented literature has revealed that different health institutions may select any of the numerous tools for use, depending on their convenience and understanding of the same. For example in South Africa, Touch Visual Pain scale (TVP) is commonly used for infants and children below three years old (Albertyn et al., 2012).

2.2.1 Pain Rating Scales in Neonates and Infant

Raff (2016) noted that self-report measures are not available for infants and non-verbal children, though behavioral indicators for example; facial expressions, crying and sleep-wake patterns can be evaluated to assess pain in such patients. According to Chiaretti et al. (2013) different behavioral scales have been validated by several studies that enrolled infants and neonates. Beltramini et al. (2017) noted that the best way to assess for pain in neonates is by observing their behavior. The quality of behavior depends on the infant’s gestational age, and maturity as well as the health state of the neonate.

In addition, Gregory and Waterman (2012) noted that interpretation of crying in infants is especially difficult as it may indicate general distress rather than pain. Cry

characteristics are also not good indicators in preterm or acutely ill infants, as it is difficult for them to produce a robust cry (Beltramini et al., 2017). Wong et al. (2012) noted that Premature Infant Pain Profile (PIPP), which consists of 3 behavioral indicators (eye squeeze, nasolabial and furrow brow bulge), 2 physiological indicators (heart rate and oxygen saturation) and 2 contextual indicators (gestational age and behavioral state) is a reliable and valid measure of acute pain in infants. Beltramini et al. (2017) suggested that Neonatal Facial Coding System (NFCS) and the Neonatal Infant Pain Scale (NIPS) as being the most commonly used behavioral measurement of pain in neonates. He noted that Neonatal Facial Coding System is used to monitor facial actions in newborns and that it has been proven reliable for short duration use in assessing acute pain in infants and neonates. It has eight indicators that are used to measure pain intensity: brow bulge, eye squeeze, nasolabial furrow, open lips, stretched mouth, lip purse, tout tongue, and chin quiver. The indicators are recorded on videotape, coded, and scored. He also described Neonatal Infant Pain Scale (NIPS) as a behavioral assessment tool that takes into account pain measurement before, during and after a painful procedure, scored in one-minute intervals. The indicators include: face, cry, breathing pattern, arms, legs, and state of arousal.

2.2.2 Pain Rating Scales in Toddlers

In toddlers, pain can be best assessed and measured using behavioral/observational methods (Twycross, 2017). Such methods involves the use of pain rating scales like NIPS, FLACC and Touch Visual Pain Scale. They are pain measurement tools recommended for infants and children aged below three years (Albertyn et al., 2012). Beltramini et al. (2017) noted that FLACC (Face, Legs, Activity, Cry, Consolability) is used in children who are below the age of three years and also older children who are not able to talk. It has a score of 10 with each parameter scoring a maximum of 2 scores. According to Mate (2014) FLACC scale is interpreted as: No pain (score of 0), Mild pain (score of 1-3), Moderate pain (score of 4-6) and severe pain (score of 7-10).

Table 2.1 shows the FLACC scale. It illustrates 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. Total points assigned may be from zero to ten.

Table 2.1: FLACC Scale

Categories	Scoring		
	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.
Cry	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

2.2.3 Pain Rating Scales in School Going Children

Twycross (2017) noted that children who are aged between 3 and 7 years are able to describe the characteristics of pain. He described observational scales and self-report scales as useful tools for assessing pain in pediatric patients who are within this age group. According to Wong et al. (2012) pain rating tools have been developed combining behavioral and biological items. Such tools include the Objective Pain Scale and the Comfort Scale. The Objective Pain Scale is used to assess both physiologic parameters and behavioral changes in children that may be modified by the presence of pain or discomfort after procedures (Lioffi & Howard, 2016).

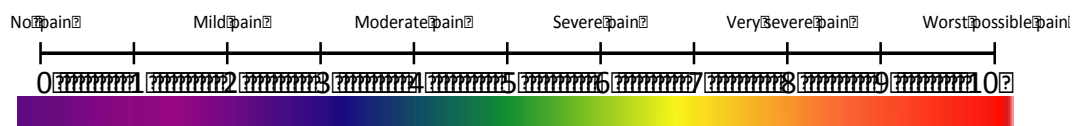
According to Twycross (2017) in younger children, developmental capabilities may hinder the use of purely numeric scales and therefore pictorial based pain scales such as the Faces Pain Scale- Revised is used. The child is asked to select 1 of 6 faces that may correctly reflect his/her pain. The child is shown pictures of six faces which are arranged from left to the right. The left face has no pain, but there is increase in pain intensity to the right face. The child is then informed that the faces show how much something can hurt. The face on the left shows no pain but the faces show more and more pain proceeding from left to right, with the right face having the most pain. The child is then asked to Point to the face that shows how much his/her pain is hurting (Mate, 2014). FPS-R scale is scored beginning from zero to 10 and interpreted as: No pain (score of 0), mild pain (score of 2-4), moderate pain (score of 6-8) and severe pain (score of 10).

2.2.4 Pain Rating Scales in Adolescents

Verbal, non - verbal and self - rating methods are commonly used in rating pain among the adolescent. However, self-report is the best method of measuring pain in older children who can describe the subjective pain experience (Twycross, 2017). Older children (>8 years of age) who are able to understand abstract concepts can use the visual analog scale (VAS) and 0 to 10 Numeric Rating Scale (NRS) The VAS uses either a vertical or horizontal premeasured line (100 mm) to estimate pain. The ends of the lines represent the 2 extremes of pain (“no pain” to “worst pain”). Curtis et al. (2012) noted that it may include a numerical representation along the line. The child makes a mark on the line to indicate his/her level of pain and pain score is calculated by measuring the distance from the left end point of the scale to the child's mark. According to Wong et al. (2012) NRS is administered as a script and the child is asked to rate his/her pain from 0 to 10, with 0 indicating no pain and 10 being the most severe pain.

Chiaretti et al. (2013) described Numeric Pain Scale or Visual Analog Scale as a single 10-cm horizontal or vertical line that has descriptors of pain at each end. Marks and numbers are placed at each cm on the line and then health care provider asks the child to show the level of pain he /she is on from the scale of zero to ten,

where zero means no pain and ten equals the worst possible pain. Beltramini et al. (2017) explained that NPS is scored from 0-10 and interpreted as: 0 is no pain, 1-3 is mild pain, 4-6 is moderate pain, 7-10 is severe pain



Harvard Medical School, Centre for Palliative Care (2007)

Figure 2.1: Numeric Pain Scale.

2.3 Utilization of Pain Rating Scales

In pediatric care, assessment and measurement of pain is complicated and therefore it requires adequate utilization of pain rating scales, and also the ability of interpreting the score accurately (Albertyn et al., 2012). Utilization of Pain rating scales among health professionals is vital for pain management in pediatric care. According to Chiaretti et al. (2013) assessment and rating of the pain in pediatric patients must be done at regular interval using appropriate pain rating scales. Gregory and Waterman (2012) noted that pain is subjective and health professionals must rely on what patient says, however this is not possible in infant because they cannot report presence of pain. Thus, self-report method is not applicable, but behavioral indices are available for use in infants. According to Raff (2016) vital signs monitoring chart should have a column on which pain intensity can be recorded regularly.

Documented literature has shown that pain rating scales are in use for assessment and measurement of pain in child health care. However, systematic review of the evidence regarding nurses' assessment of post-operative pain in children found that behavioral cues are considered more important than self-report of their pain. It was also revealed that a significant proportion of children did not have pain scores recorded within the first 24 hours after surgery (Twycross, 2017). Literature has revealed existence of many validated pain rating scales for use in pain management among pediatric patients, though different children hospitals use different PRS for

pain measurement in pediatric care (Hauer, 2017). According to Raff (2016) pain rating scales should be chosen for a given institution and used consistently. Such scales should be appropriate to the patient's developmental age, simple-to-use, and easily understood by the patient. Chiaretti et al. (2013) noted that selection of appropriate pain rating scales should consider the type of pain, cognitive level, presence of disability, and the situation in which pain occurs. Gregory and Richardson (2014) found that no one pain assessment scale is used across all health care organization.

A study done by Tsze et al. (2013) on Validation of Self-Report Pain Scales in Children shown that Faces Pain Scale–Revised (FPS-R) and Color Analog Scale (CAS) are self-report pain scales commonly used in children but insufficiently validated in the emergency department setting. The study validated their use in children over 7 years but questioned their validity in less than seven years. Koch (2013) suggested that “patient self-reporting is the most reliable indicator of the existence and intensity of pain. In another study by Gregory and Richardson (2014) on the use of Pain assessment tools in clinical practice, verbally applied self-report pain assessment scales were found to be available and applied in clinical practice. It was noted that nurses used one or a number of self-report pain assessment scales in their clinical practice.

The Numerical Rating Scale was used most commonly, but no one assessment scale was used universally in all the hospitals and clinical areas represented by the sample. Behavioral pain assessment scales, were used by 42% of the respondent. In addition, the study revealed that patients with mental challenge had no available pain rating scales in the majority of organizations represented.

Zahra (2015) noted that children might not be able to indicate pain. Therefore, health care providers should assess and measure pain in pediatric patients without waiting for them to indicate it. In such patients, pain may be recognized, and treated using appropriate pain rating scales (Bennett, 2019). Chiaretti et al. (2013) found that in children, selection of appropriate pain assessment tools should consider cognitive level of the patient, age and the presence of eventual disability. Documented

literature has identified three main methods that can be used to measure pain intensity. These methods include behavioral/observational (how the child behaves), self-report (what the child says), and physiological/biological (how the child's body reacts) measures. Self-report measures are based on what the child report of his/her pain. Observational/ behavioral measures are based on observation of how child react to pain, while biological measures deals with physiologic parameters that may be changed by the presence of pain. Such parameters include respiratory rates, blood pressure and heart rate (Beltramini et al., 2017). However, documented literature has suggested the use of combined methods of behavioral, self-report and physiological methods used together as more appropriate in rating pain in child health care (Christina, 2016).

2.4 Factors Influencing Utilization of Pain Rating Scales

2.4.1 Health System Factors

Although no much literature has been documented, health system factors can contribute largely to utilization of pain rating scales among health professionals. Literature review indicates that utilization or non-utilization of pain rating scales in most hospitals is associated with health system factors. A study done by Olayinka et al. (2018) in a Nigerian hospital to determine factors associated with utilization of pain rating scales among nurses found that 90% of the nurses reported lack of pain rating scales, while workload for nurses was reported as a factor by 83% of the nurses.

Dick et al. (2016) identified Lack of age-appropriate and validated pain-measurement tools, Lack of training on the use and implementation of pain measurement tools as factors that may limit utilization of pain rating scales. Other factors included unfavorable environment, lack of protocol to guide assessment of pain and failure to have specified areas for recording pain (Olayinka et al., 2018).

Ehwarieme, Amiegheme, and Chinenye (2018) did a study in a hospital in Benin among the nurses on factors affecting utilization of pain rating scales and found that seminar/workshop as a factor that affected utilization of pain rating scales. The study

found that 61.0% of the nurses had attended workshop/seminar while 39.0% had never attended any seminar. Other factors identified in this study were inadequate staff training on pain rating scales and their utilization which was reported by 94% of the nurses. Nursing service unit was reported to lack implementation attitude by 89% of the nurses who were interviewed. According to Zahra (2015) post graduate training is a factor that can influence utilization of pain rating scales. Gregory and Waterman (2012) noted that nurses who had been trained on pain, provided good pain management to the patients.

2.4.2 Other Factors

Pain rating scales are essential tools in pediatric care, and their utilization among health professionals is of great value in management of pain in pediatric patients. Documented literature has revealed that utilization of these tools require adequate knowledge, positive attitudes and perception as well as skills among the health professionals (Schafer, 2016). These among other factors can influence utilization of pain rating scales in pediatric care among health care providers. According to Zahra (2015) little progress has been done toward integration of pain measurement tools into routine hospital care. And pain assessment has not become the ‘fifth vital sign’(Wong et al., 2012). This could be associated with factors attributable to utilization of pain rating scales among health professionals.

Schafer et al. (2016) noted that clinicians and medical students rated pain in different intensity, with clinician rating pain as being more intense than did the medical students. She also noted that there were different perceptions between nurses and physicians. However, she did not note any difference in pain assessment regarding years of experience among the health professionals. Years of experience and level of education were identified by Gropelli and Sharer (2013) as factors that can have influence on pain management. Ehwarieme et al. (2018) suggested that health care providers with knowledge on pain rating scales were more likely to utilize pain rating scales more effective than those with inadequate knowledge, while Gropelli and Sharer (2013) observed that education of nurses has an impact on appropriate pain management, and that knowledgeable nurse is more likely to

provide more effective pain management. Gregory and Waterman (2012) observed that not only useful to have knowledge on pain management but also skills of health professionals are equally important. Such skills should include utilization of pain rating scales. Ehwarieme et al. (2018) identified lack of knowledge among the nurses as a factor that is associated with non-utilization of pain rating scales, while Kahsay (2017) identified Lack of knowledge on how to interpret a pain score as a factor that limit utilization of pain rating scales.

2.5 Challenges Associated with Utilization of Pain Rating Scales

Utilization of pain rating scales in child health has not been without challenges. In pediatric patients, literature has documented challenges that are either directly or indirectly associated with PRS. According to Zahra (2015) little progress has been done toward integration of pain measurement tools into routine hospital care. And pain assessment has not become the ‘fifth vital sign’(Wong et al., 2012). This could be associated with the challenges attributable to the use of pain measurement tools by the health care providers.

Uwaezu (2014) found that lack of knowledge on the policy and procedures of pain management is one of the causes for poorly controlled pain. Documented literature has revealed that health care providers with inadequate knowledge on pain rating scales do not provide effective pain control. According to Gropelli and Sharer (2013) education of nurses has an impact on appropriate pain management and that the expert nurse is more likely to provide more effective pain management.

Gregory and Waterman (2012) noted that Pain is subjective and health care providers must rely on what patient says, however this is not possible in neonates, infant and other young children whose developmental milestone does not allow them to express presence of pain. Therefore, self-report measures are unavailable, but behavioral indices are available for such children. In addition, children may behave in the same manner when they have discomfort which may not mean pain and it poses a challenge in behavioral indices (Uwaezu, 2014).

Zahra (2015) noted that challenges associated with utilization of pain rating scales included: Lack of age-appropriate and validated pain-measurement tools, Lack of training on the use and implementation of pain measurement tools, Lack of knowledge on how to interpret a pain score and Lack of knowledge on how to differentiate between pain, anxiety, and emotional issues such as fear, depression and discomfort. Gregory and Waterman (2012) noted that workload and time available for the health care providers as barriers to utilization of pain measurement tools.

2.6 Conclusion

Pain management involves assessment and measurement of pain. To adequately assess a child's response to treatment, it is necessary to have ongoing assessment of the child's pain. Because pain is a subjective experience, individual self-reporting is the preferred method for assessing pain. However, for children who cannot communicate this information due to age or developmental status, observational and behavioral assessment tools are acceptable alternatives. Depending on the age of the child and his/her ability to communicate the information to the health care provider, there are many reliable, valid and clinically sensitive assessment tools available for use (Ternullo & DiAntonio, 2015). Research has shown that different tools are used in assessment of pain, but some are preferred over others. However, though no documented evidence, many hospitals never or they rarely rate and document pain intensity in pediatric patient and especially in the developing countries. Whenever possible, behavioral measurement of pain should be used in conjunction with self-report and physiological signs (Bennett, 2019).

IT IS IMPORTANT NOT ONLY TO ASSESS THE INTENSITY AND FREQUENCY OF PHYSICAL PAIN BUT ALSO THE PRESENCE AND INTENSITY OF OTHER SUFFERING (TOTAL PAIN). THOUGH NUMEROUS TOOLS OF MEASURING PAIN INTENSITY IN CHILD HEALTH CARE HAVE BEEN INVENTED, MANY CHALLENGES HAVE EVOLVED RANGING FROM LACK OF KNOWLEDGE ON SUCH TOOLS TO IMPLEMENTATION OF THE SAME ESPECIALLY BY THE HOSPITALS IN THE DEVELOPING COUNTRIES. RESEARCH HAS DEMONSTRATED THAT PAIN RATING IN CHILDREN IMPROVES CHILD HEALTH DUE TO RELIEVED PAIN (BAWA ET AL., 2015). MOST OF KENYAN HOSPITALS HAVE NOT ADOPTED PAIN RATING SCALES FOR USE IN CHILD HEALTH CARE.

CHAPTER THREE

STUDY METHODOLOGY

3.1 Study Design

Descriptive cross sectional study design was utilized in this study. The purpose of descriptive studies is to observe, describe, and document aspects of a situation as it naturally occurs (Denise & Chery, 2003). This study has described the utilization of pain rating scales among health professionals at Gertrude's children's hospital. Data was collected at one point in time (one month) without following the respondents for a long period, and analyzed using descriptive statistics hence making this design appropriate for the study.

3.2 Study Area

The study was conducted at Gertrude's Children's Hospital (main hospital) in Nairobi County. Gertrude's Children's Hospital is a private hospital and the only largest children hospital in Kenya, which has adopted pain rating scales. It is comprised of five wards, high dependency unit (HDU), intensive care unit (ICU), theatre, and out - patient department. It has bed capacity of 110 beds which are distributed in the five wards, HDU and the ICU. The bed occupancy rate is over 80%. A total estimation of 280 health care professionals provide their services directly to pediatric patients in the hospital. The hospital also has a training school for higher diploma in pediatric nursing and pediatric intensive care unit nursing. The patient staff ratio is close to the WHO requirement making it a suitable facility to implement pain rating scales.

3.3 Study Population

The study targeted health professionals working at Gertrude's Children Hospital. They included nurses, medical officers and pediatric consultants. They were targeted because they were directly involved in children care. Their total number was estimated to be 280. It included 200 nurses, 60 medical officers and 20 pediatric consultants. Patients' medical records were also scrutinized for verification of

recorded information on tools used in assessing and scoring the pain intensity. This was done to both admitted patients and the out patients.

3.4 Sample Size

The desired sample size was determined using Cochran formula. Sarmah, Hazarika, and Choudhury (2013), stated that Cochran formula can be used to determine ideal sample size when the population is less than 10,000.

$$n = n_0 \div \{1 + (n_0 + 1 \div N)\}$$

But n_0 is given by:

$$n_0 = (z^2 \times p \times q) \div d^2$$

Where: z = std normal deviate at the desired 95% confidence level (1.96),

p = prevalence. (P will be 42% which has been documented in literature by Gregory and Richardson (2014) as the prevalence of utilization of behavioral pain assessment scales).

$$q = 1 - p,$$

d = degree of accuracy desired, here set at 0.05

In substitution

$$n_0 = 1.96^2 \times 0.42 \times (1 - 0.42) \div 0.05^2 = (1.96^2 \times 0.42 \times 0.58) \div 0.05^2 = 0.9358 \div 0.0025 = 374$$

$$\begin{aligned} \text{Therefore, } n &= n_0 \div \{1 + (n_0 + 1 \div N)\} \\ n &= 374 \div \{1 + (374 + 1 \div 280)\} = 374 \div \{1 + 1.339\} \\ &= 374 \div 2.339 = \underline{159.9} = 160 \end{aligned}$$

Required sample size was a minimum of 160 health professionals.

To determine the number of study participants from each stratum, the researcher used probability proportion to size. Nurses were $200 \div 280 \times 160 = 114$ (71.25%), Medical

Officers were $60 \div 280 \times 160 = 34$ (21.25%), while pediatric consultants were $20 \div 280 \times 160 = 11.4$ (7.1%)

Nurses	Medical Officers	Pediatric Consultants
$200 \div 280 \times 160 = 114$	$60 \div 280 \times 160 = 34$	$20 \div 280 \times 160 = 11.4$ taken to be 12

The same method was used to determine the sample size of the patients' medical records which were scrutinized.

From $n = n_0 \div \{1 + (n_0 + 1 \div N)\}$ where N is 80% of 110=88 (80% is occupancy rate, 110 is bed capacity) n_0 is 374

$374 \div \{1 + (374 + 1 \div 88)\} = 374 \div 5.261 = 71$ medical records.

$71 \div 5 = 14.2$ which is approximately 14 medical records from each ward.

3.5 Sampling Procedure

Health professionals were stratified into three strata, based on their designation that is Nurses, Doctor, and Pediatric Consultants. Then, simple random sampling method was used to select the study participants who were interviewed. Duty Rota was used as the sampling frame. Enrollment for the study was done based on the working shift of the health professionals. Patients' medical records were also selected randomly using simple random sampling. This was done in all the units using register as the sampling frame.

3.6 Inclusion Criteria

In this study, only pediatric consultants, medical officers, and nurses, who consented to participate in the study were included. Additionally, patients whose medical records were provided by the head of clinical services were included.

3.7 Exclusion Criteria

All health professionals including Medical Officers, and Nurses, who were on locum basis or were absent from work station during the period of data collection were excluded from the study.

3.8 Study Tools

Data was collected using semi- structured self-administered questionnaire, key informant interview guide (KII) and observation check list. Literature review and objectives of the study informed the development of the tools by the principle researcher. Both the questionnaire and key informant interview guide had questions which guided the respondents to give the information relevant to the study while check list was used to capture the age of the patient and the type of the tool used in assessing his/her pain.

A semi-structured self-administered questionnaire was used to collect data from the health professionals because it guided them on giving the exact information needed in the study. The information collected included demographic data (which included gender, level of education, experience, and department where the respondent worked in), hospital contribution on utilization of pain rating scales and challenges associated with utilization of pain rating scales. To supplement the data, heads of departments/units were interviewed using key informant interview guide, and a check list was used in assessment of the patients' medical records for verification of information on utilization of pain assessment tools.

3.9 Pre-Testing of the Tools

Data collection tools were pretested to ensure that they could capture the intended information. This was done at satellite clinic of Gertrude's Children's Hospital at Nairobi West, to reduce chances of selecting the same participant during the actual data collection, hence minimize bias. The clinic has its staff who are independent of the main hospital. Questionnaire were pretested using 10% of the sample size (16 Health Professionals), while observation check list were pretested using 10% of

sample size (7 patients' medical records), and 2 heads of departments (one from medical ward and the other from outpatient department) were interviewed using key informant interview guide. Besides pretesting, the tools were also subjected to critique and evaluation by the supervisors to ensure that they were valid.

3.10 Recruitment of Research Assistant

One research assistant was recruited to assist in data collection i.e. distribution of the semi-structured questionnaires to the study participants. The recruitment was based on the fact that he was trained on research methodology, importance of accuracy in data collection and entry, and ethical legal considerations in research while in school.

The selected research assistant was then subjected to two days of intensive training by the researcher. Some of the areas that he was trained on included: how to obtain informed consent from the participants, interviewing skills, sampling criteria, review of research ethics, and how to fill checklist in verification of patients' documents for evidence of utilization of PRS. He then signed the confidentiality agreement form.

3.11 Data Collection Process

Data was collected on week days for a period of one month, aiming at ensuring that no interference with service delivery to the patients occurred. Introduction was done to the study participants including explanation on the benefits of the study, and they consented to participate in the study. Study participation was on voluntary basis. Both the principal researcher and the research assistant participated in distribution of the questionnaires to the study participants (all could read and write).

Heads of departments/units were interviewed using key informant interview guide. This was a guided face to face interview with the researcher asking the questions while the research assistant was audio recording. Interview was done based on the convenient of the participants and willingness to participate in the study. Observation check list was used to collect the data from the patients' document. This was done after the hospital management authorized the access of the information from the patients' document. The information was available online.

3.12 Data Management

The filled questionnaires were reviewed by the principal investigator with a view of making sure that they were completely filled. Cleaning and coding was done before data was entered into a password protected MS Access database. The entered data was then compared with the hard copy of semi-structured questionnaire to ensure accuracy. On completion of the data entry exercise, analysis was done using SPSS Version 21.0. Quantitative data was analyzed using descriptive statistics whereby data was summarized using frequency tables and presented using pie chart, and bar graphs. Qualitative data was analyzed using inductive approach. A content analysis was performed based on stages of qualitative data analysis. Audio recorded data was transcribed to establish first impression and re-read in details identifying relevant data, key words/phrases before coding was done. Codes with similar contents were grouped together and related to the study objectives for validation. Results were presented in narrations.

3.13 Ethical Consideration

Approval to carry out the research was sought from the Jomo Kenyatta University of Agriculture and technology ethics and research committee, and also ethics committee from Gertrude's children's hospital. Permission to access patients' medical records was sought from the hospital's head of clinical services.

During the study, research ethics principles were strictly observed at all levels. Participation was purely on voluntary basis. The study was explained comprehensively to the subjects, including the duration and the benefits of the study. Informed written consent was sought from the participants before they were included into the study. To ensure privacy and confidentiality, participants' names and other identifying characteristics were not documented.

In addition, only the investigator and research assistants had access to the data. The filled questionnaires and consent forms were packaged well and stored in a safe cabinet as evidence that the data was actually collected, and also for reference

CHAPTER FOUR

RESULTS

4.1 Demographics Characteristics

Health professionals were interviewed and their demographic characteristics summarised as illustrated in table 4.1. A total of 160 questionnaires were distributed to the study participants, with a return rate of 98.8%. Female were majority of the respondents (63.46%), with Nurses being the highest percentage of health professionals (73.5%) while consultant had the lowest percentage (6.5%). Majority of the respondents had diploma as their highest level of education (41%) while master's degree holders were the least (6%). Most of health professionals (57.3%) had 1-5 years of experience, whereas those with over 10years were the least (8.3%).

Table 4.1: Demographic Characteristics

		Frequency	Percentage
Gender (n=156)	male	57	36.5
	female	99	63.5
Level of education (n=157)	Diploma	63	41
	Higher Diploma	40	26
	Degree	42	27
	Masters	9	6
Designation (n=155)	consultant	10	6.5
	Medical Officer	31	20
	Nurse	114	73.5
Departments (n=156)	OPD	36	23.1
	Wards	76	48.7
	ICU	20	12.8
	HDU	13	8.3
	Theatre	11	7.1
Experience (n=157)	Below 1 year	16	10.2
	1-5 years	90	57.3
	6-10 years	38	24.2
	Over 10 years	13	8.3

4.2 Level of utilization of pain rating scales among health professionals at Gertrude's children's hospital.

4.2.1 Utilization of pain rating scales

Theme 1: Hospital has pain rating scales

All the study participants (100%) confirmed that the hospital has pain rating scales for assessing and measuring pain in paediatric patients. One of the key informants stated the following:

“When I joined this hospital these tools were not in use, we introduced them like more than five years ago. With standardisation, the accrediting institutions guide you on what to do so that your facility can be accredited. They tell you to do this and that so that you can get better outcome. This became an eye opener to us. Again, being a children hospital you realize that the children are not able to talk for themselves and the mothers may also just cry with them. So we needed something to guide us in getting the exact feeling of a child and we went out locally for bench marking but we did not get any hospital locally using them, though internationally we were able to find them and that is why we opted to be utilizing pain rating scales.” (KII 1)

Theme 2: Pain is considered as the fifth vital sign

Pain rating scales were being used at the hospital to measure pain as the fifth vital sign. They were being utilized after every four hours or when the intervention done was not effective. This was explained by key informant 2 as follows:

“Assessment and measurement of pain has helped us in understanding what pain in children entails. You see pain is the fifth vital sign and we assess it when we are taking vital sign after every four hours or if the intervention done by the nurse mostly the use of medication or any other method is not effective, then it can be reassessed before four hours are over.” (KII 2)

In addition, it was observed through check list that the hospital had adopted four different pain rating scales to assess and measure pain in patients. The noted tools

included Neonatal Guide Scale, FLACC, Wong Baker Faces pain scale and Numerical pain rating scales. Key informant 1 explained this by stating the following:

“We did a lot of research in the internet in other children’s hospitals across the world and looked at their documents and compared them, then opted for what could suit our hospital and that is how we adopted them. We have the Neonatal, the FLACC, Faces and Numerical.” (KII 1)

However, frequency of utilizing these tools varied among health professionals. Majority (90%) utilized them always, 8% at times, while 2% utilized them when necessary as illustrated in figure 4.1.

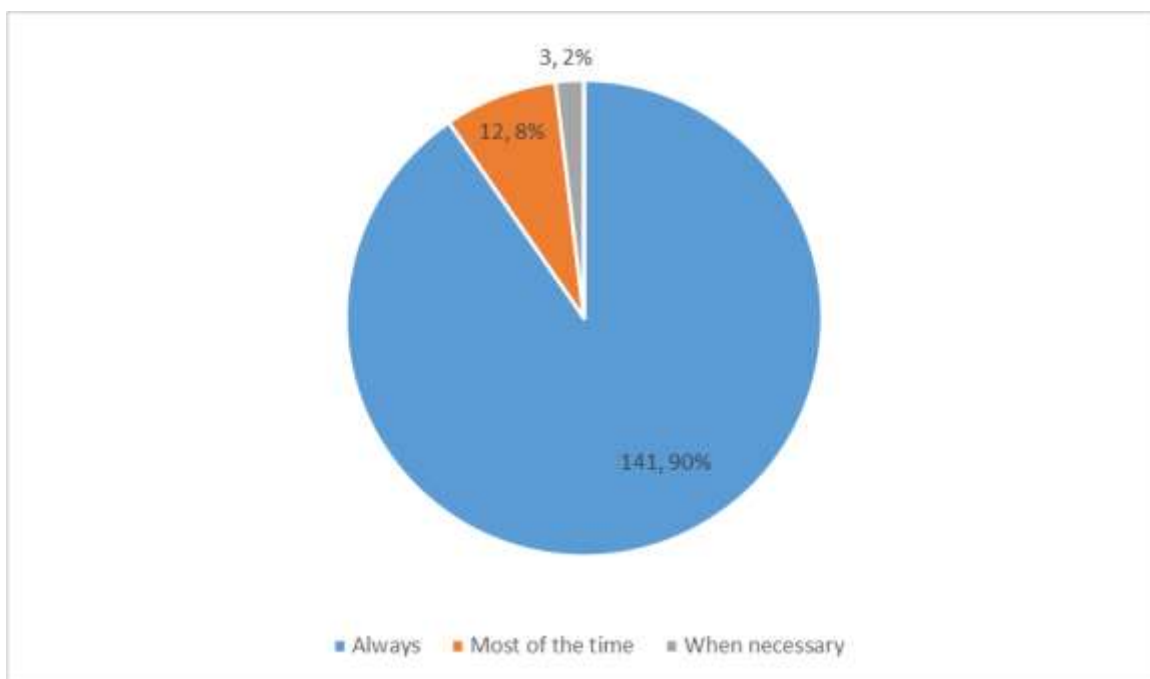


Figure 4.1: Frequency of utilization of pain rating scales

4.2.2 Documentation of the measured pain

Theme 3: Measured pain is documented

All the study participants reported that they document pain assessed in patients. Documentation was being done on line (in pain bundles). Key informant 1 asserted by stating the following:

“You know when we started, we started with hard copy which is expensive, but now we are on line, I mean we are paperless.” (KII 1)

Further, upon scrutinizing patients’ medical records, pain was noted to have been assessed and recorded in pain bundles by nurses only (on line recording). This was explained by key informant 3, as follows: *“It is the nurses who mainly document though other health professionals they do. I will say that 99% of documentation is done by the nurses. But most of these tools are put on nursing documents. You know nurses are usually the first ones to be in contact with patients. When you come in the hospital you will meet the nurse first as the triage person. So it is the nurse to assess the pain first and manage it based on the guide as per the score and the scope of practice. Or at times they consult on management of the assessed pain.”(KII 3)*

More so, 5.7 % of the recorded pain was assessed in neonates using Neonatal Guide Score at 100%, infants 17.1% assessed using FLACC at 100%, toddlers had 31.4% assessed using both FLACC and Wong Baker Faces pain scale at 95.5% and 4.5% respectively. Pre-school children, had 15.7% assessed using two different tools (Wong Baker Faces pain scale 90.9% and Numerical pain scale 9.1%). School going children had 20% assessed using three different tools (FLACC 7.1%, Wong Baker Faces pain scale 78.6% and Numerical pain scale 14.3%), while adolescents had 10% of the recorded pain assessed using two different tools which included Wong Baker Faces pain scale at 14.3%, and Numerical pain scale at 85.7%. Thus, the most used tool was FLACC at 48.6%, while Neonatal Guide Score was the least at 0.6%, as illustrated in table 4.2.

Table 4.2: Documentation of the rated pain

Age group (n=71)	Too Used	Frequency	Percentage
Neonates	Neonatal guide scale	4	5.6
Infants	FLACC	12	16.9
Toddlers		23	32.4
	FLACC	22	95.7
	Wong Baker faces pain scale	1	4.3
Pre-school children		11	15.5
	Wong Baker faces pain scale	10	91
	Numerical pain scale	1	9
School going children		14	19.7
	FLACC	1	7.1
	Wong Baker faces pain scale	11	78.6
	Numerical pain scale	2	14.3
Adolescents		7	9.9
	Wong Baker faces pain scale	1	14.3
	Numerical pain scale	6	85.7

4.2.3 Most Preferred pain assessment tool

Theme 4: Some tools are preferred in measuring pain.

The study participants conceded that all tools were effective for use in different age groups though they preferred some over the others.

Wong Baker Faces pain scale was preferred by 11% of health professionals because it was easy to use, FLACC by 6.5%, because it was well detailed and many patients were in the age group that could be assessed using it, while 2.5% preferred Neonatal Guide Score because it was efficient. However, the largest percentage of the respondents did not have preference of any tool because they are all effective and are age dependent (Table 4.3).

Table 4.3: Preferred pain assessment tool

Tool (n=155)	Frequency	Percentage
Neonatal guide score	4	2.5
FLACC	10	6.5
Wong Baker Faces pain scale	17	11
Numerical pain scale	10	6.5
All of them	114	73.5
TOTAL	155	100

4.2.4 Rating the utilization of pain rating scales

Utilization of pain rating scales at the hospital was rated using a five point Likert scale, and 64.3% of the respondents rated it as being excellent, 29.3% very good while 6.4% rated it as being good as shown in figure 4.2. In addition, scrutiny of patients' medical records revealed that only one patient had not been assessed for pain. This was about 1.5% of non-utilization of pain rating scales and therefore the level of utilization was 98.5% which was excellent based on the scoring range (below 40% poor, 40%-59% good, 60%-79% very good, 80% and above excellent).

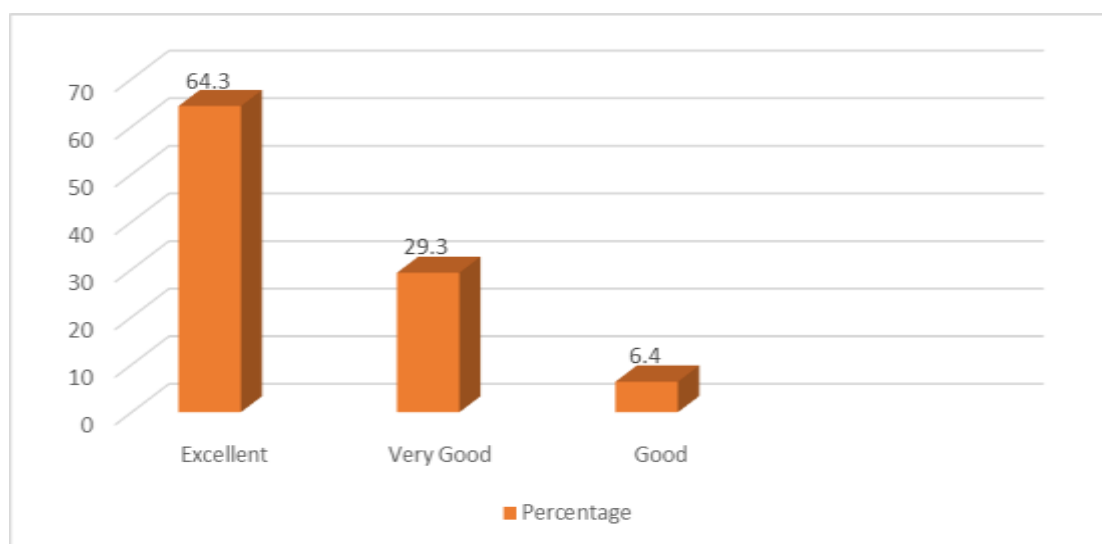


Figure 4.2: Rating of the utilization of pain rating scales

4.2.5: Training on pain rating scales.

Majority (98%) of study respondents were trained on pain rating scales with the highest percentage (96.7%) of them being trained in-service (while in practice). They reported that they learned about them in their place of work through continuous medical education (62.3%), seminars (24.7 %,) and palliative care training (9.7%) as shown in Figure 4.3.

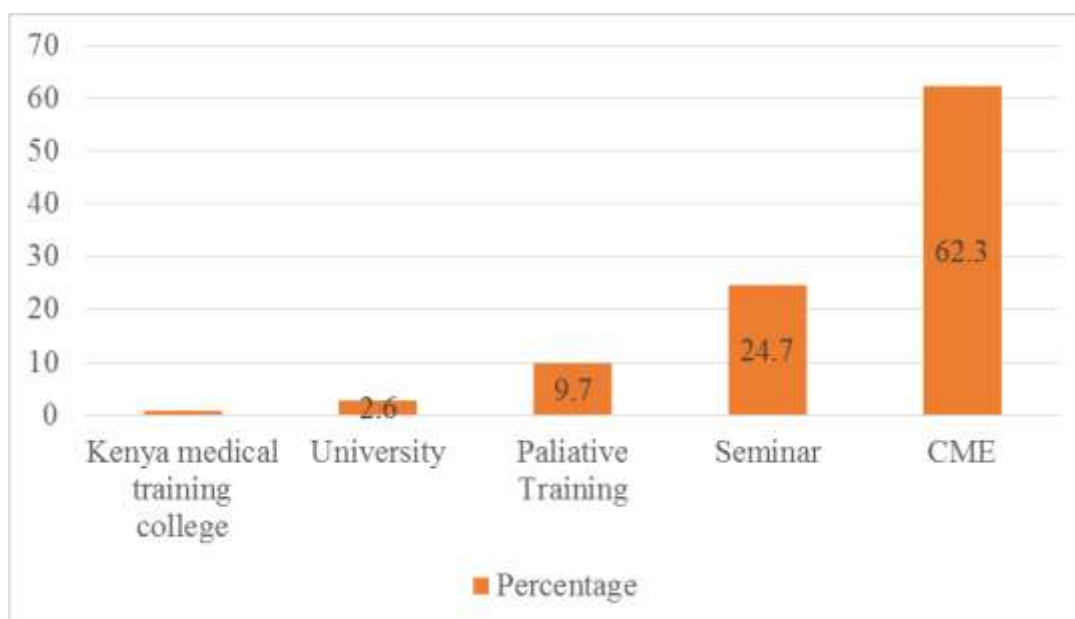


Figure 4.3: Place where training on pain rating scales was done.

4.3 Perception of health professionals on importance of use of pain rating scales in measurement of pain in paediatric care.

Theme 5: Pain rating scales are important in child health care

Health professionals perceived utilization of pain rating scales in paediatric care as being extremely necessary. Besides, key informants 1 and 4 asserted that health professionals liked utilizing pain rating scales because they perceived it useful in provision of care to paediatric patients. They stated the following:

“They like using them because it has given them a guide on what to do. It is actually making their work easier both physical and scientific. You know you must also have

evidence. So it is also a real good guide for the nurses other than long time ago when we used to ask why the child is crying: is it pain, or is it that mother is not there?" (KII 1)

"You see pain rating scales help us know exactly the pain issues of the child." "Before I joined this hospital, I was in adult hospital with a bit of clinical experience in paediatric but it was like guess work. You know in adult setting adults will say when in pain. So it was very easy even without measurement tools but for the children it is very hard unless the child is able to speak, then you may not be able to get pain in them. So it is a very good experience that pain rating scales were introduced in paediatrics and I would recommend every paediatric setting to use them." (KII 4)

From the quantitative results, the reasons why pain in paediatric patients should be measured, included: variation in pain intensity (7%), to determine the intervention (53.2%), to promote comfort of the patients (12%), an indicator for good prognosis(1.9%), because pain measurement tools are available (5.1%), because children cannot communicate (10.8%), to give medication in good time(1.3%), research has proved that pain assessment tools are effective (2.5%),to get data for formulating nursing diagnosis(2.5%), while 3.8% reported that pain in children is assessed to help in evaluation of patients' care.

Besides, 5.8 % of the respondents suggested that they would like to have a tool for assessing pain in cognitively impaired patients, 9.8%, suggested the need for training health professionals on all available pain rating scales apart from those at hospital, while 1.9% suggested that they would like to have frequency of staff training increased and especially for the newly employed staff.

4.4 Health system factors supporting the utilization of pain rating scales.

Theme 6: Role of the hospital in utilization of pain rating scales.

Health system factors that supported utilization of pain rating scales were explored and majority of the study participants (99.4% of them) reported that hospital had

played a role in utilization of pain rating scales among health professionals. This was asserted by key informant 5 by stating the following: *“We do regular auditing and it is a measurable element in a monthly reporting in the ward. We have CME every Wednesday though we do not discuss pain rating scales always but also we pick on where there is issue. We have orientation programme and also during handing over report, the ward manager always has to check if pain assessment has been charted.”* (KII 5)

However, 0.6% of the study participants were of the contrary opinion. The named hospital contributions included frequent updates, protocol for pain management, staff training on pain assessment tools, auditing, supportive supervision, availability of pain rating scales, pain management committee, and continuous medical education on pain assessment tools as shown in the Table 4.4.

Table 4.4: Hospital contribution on utilization of pain rating scales

Characteristics of Hospital Contribution (n=156)	Frequency	Percentage
Frequent update	16	10.3
Protocol for pain management	39	25
Staff training	43	27.6
Auditing	26	16.6
Supportive supervision	10	6.4
Availability of PRS	9	5.8
Pain management committee	7	4.5
CME	6	3.8
Total	156	100

In addition, 91% of the study participants reported that they had ever been facilitated by the hospital on the above named hospital contribution regarding utilization of pain rating scales. However, 9% of the respondents reported that they had never been facilitated (Figure 4.4).

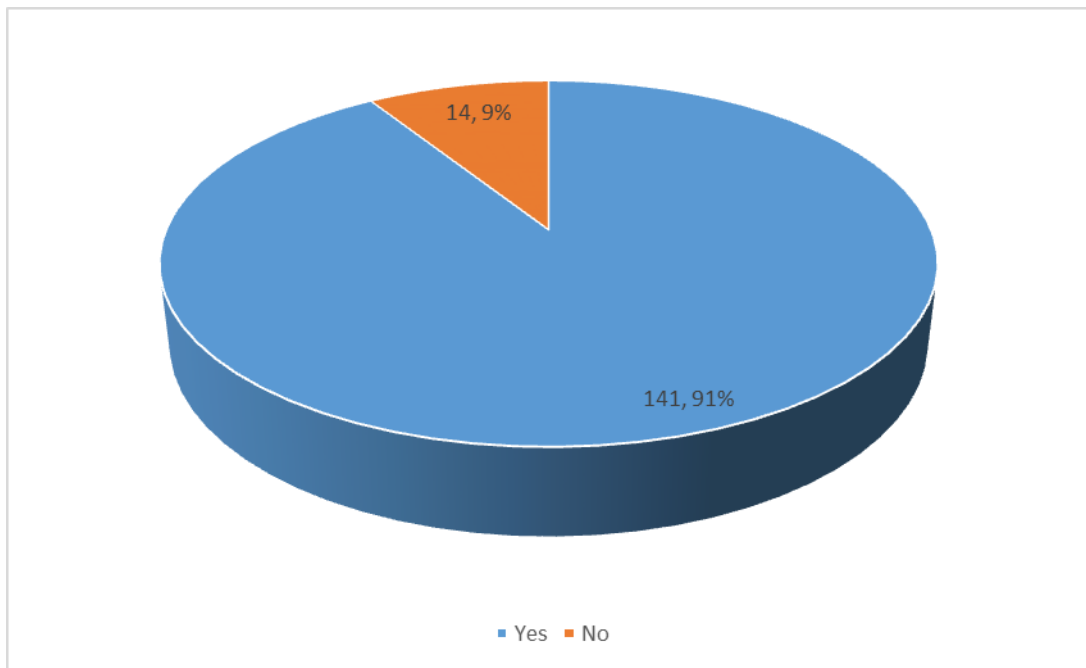


Figure 4.4: Health professionals facilitated by the hospital

As illustrated in Figure 4.5, 30.6% of respondents reported that hospital has facilitated them on continuous medical education (CME) two times, 16.7% on seminars once, 28.5% on induction programme three times, 11.8% on both CME and staff training four times while 12.5% on induction and CME many times.

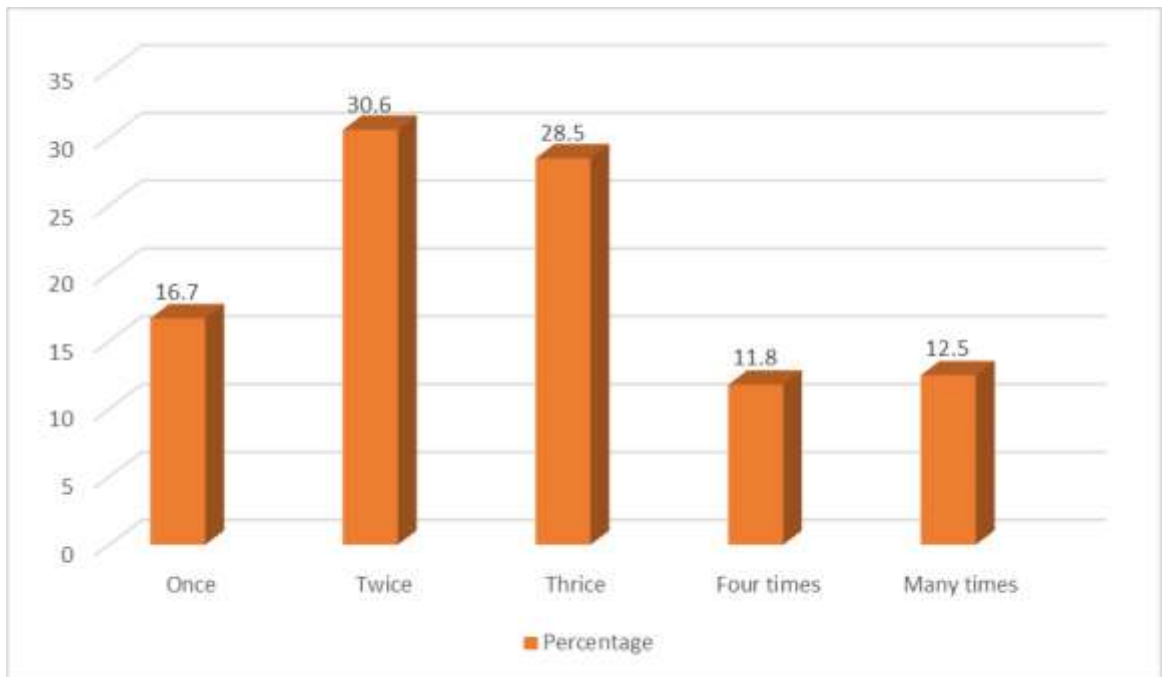


Figure 4.5: Number of times health professionals were facilitated by the hospital

4.5 Challenges experienced by health professionals in the utilization of pain rating scales

Theme 7: Utilization of pain rating scales has challenges.

Most of the study participants (94.9%), reported that they did not have any challenge with the pain rating scales at Gertrude’s children’s hospital. However 5.1% of the participants said that the tools could not measure pain in cognitively challenged patients effectively. Besides, key informant 1, 2, and 3 agreed that utilization of pain rating scales is not without challenges. According to key informant 3, almost all the new employees did not know how to use pain rating scales or even be aware of them at the time of recruitment, as stated: *“We get the problem with our new employees on assessing for pain because probably they are doing it for the first time and even others say that they are not aware that pain can be measured.”* (KII 3) This was further emphasized by key informant 1 as follows: *“When we introduced pain rating scales we had to do sensitization to all the nurses and then the doctors as well. It was*

hard to teach them. For new employees we attach them to old and experienced nurses for six weeks so that they can learn how to use these tools.” (KII 1)

Presence of challenges was further emphasized by another key informant

“I can’t say 100% that no challenges, but as human being we also have to push some of the nurses. You find that some nurses will assess the pain but they don’t document. Such gaps do exist but we normally tell them that whatever is not charted is not done. Also there has been confusion on what tool to use on who, especially FLACC has caused a lot of confusion. It is supposed to be used in children who are also cognitively challenged whether they are toddlers or over age, but you find somebody using numerical pain scale in these children.” (KII 2)

On challenges that may be faced by healthcare providers or in other settings one of the key informants stated: “other challenges that may make other paediatric hospitals not to utilize these important tools may include reasons like lack of knowledge of the clinical people: maybe they don’t know about them, may be they are not aware that these tools exist and even though they are aware, they have not been put down to use them and may be they don’t understand the importance of using them. If these tools are also not available, then it is a big challenge in using them. You see you cannot use what is not available.” (KII 1)

CHAPTER FIVE

DISCUSSION, CONCLUSION, AND RECOMMENDATION

5.1 Discussion

This study assessed the utilization of pain rating scales at Gertrude's children's hospital as a basis for making recommendation for their adoption by the Ministry of Health, Kenya. A total of 158 health professionals and 5 heads of departments participated in the study. Patient medical records amounting to 71 were also involved. The revelation by this study that pain in pediatric patients was being assessed after every four hours or when interventions done were not effective was in agreement with Raff (2016) suggestion that pain may be considered as the fifth vital sign and should be measured along other vital signs and recorded at a regular interval. However, it contradicted the finding by Twycross (2017) who reviewed on guidelines, strategies and tools for pain assessment in children and noted that a significant proportion of children did not have pain scores recorded within the first 24 hours after surgery.

These tools were frequently utilized with 90% of health professionals utilizing them always. The revelation was contrary to the study done in a Canadian hospital by Bonnie et al. (2012) who revealed that pain rating scales were not frequently being utilized. However, the study agreed with Chiaretti et al. (2013) that assessment and rating of the pain in pediatric patients must be done at regular interval using appropriate pain rating scales. Though no much documented literature on where to record pain score, Gertrude's children's hospital has adopted on line recording. This has been possible because the hospital has embraced modern technology (digital technology) which is described as cheaper compared to 'analogue' (use of hard copy). Raff (2016) suggested that vital signs monitoring chart should have a column on which pain intensity can be recorded regularly.

Most of the health professionals who utilized these tools were nurses at 99%, in contrary to the findings in a similar study done in Nigeria by Olayinka et al. (2018) which revealed that only few nurses (32%) utilized pain rating scales in assessment

and measurement of pain. The criteria used by the hospital in adoption of pain rating was mainly due to their appropriateness and suitability. This concurred with a suggestion by Raff (2016) that pain rating scales should be chosen for a given institution and used consistently and the observation by Gregory and Richardson (2014) that no one pain assessment scale is used across all health care organization. Dick et al. (2016) asserted that no single tool has been identified as ideal despite development of over 40 pain assessment tools. Chiaretti et al. (2013) noted that selection of appropriate pain rating scales should consider the type of pain, cognitive level, presence of disability, and the situation in which pain occurs.

Utilization of neonatal guide score in neonates as the only tool at 100%, concurred with an observation by Beltramini (2017) who did a systematic review on pain assessment in children and noted that Neonatal Infant Pain Scale (NIPS) is the behavioral tool for measurement of pain in neonates. Wong Baker faces scale was utilized in toddlers at 4.5%, in preschool children at 90.9%, in school going children at 78.6%, while in adolescent at 14.3%. Twycross (2017) observed that children who are aged between 3 and 7 years are able to describe the characteristics of pain. He described observational scales and self-report scales as useful tools for assessing pain in pediatric patients who are within this age group. Thus the utilization of Wong Baker faces scale in toddlers and in preschool children at the hospital is in agreement with Twycross's (2017) observation though it disagrees with utilization of the same in school going children and the adolescents.

Numerical pain scale was utilized in preschool children at 9.1%, school going children at 14.3% and in adolescent at 85.7%. Twycross (2017) asserted that Self-report is the best method of measuring pain in older children who can describe the subjective pain experience. Numerical pain scale is an example of self-report method of measuring pain in older children (>8 years of age) who are able to understand abstract concepts. Preschool children cannot understand abstract concept and therefore the use of numerical pain scale in this age group did not concur with Twycross's (2017) observation.

Wong Baker faces pain scale was the most preferred tool at 11% because it was easy to use. This finding was similar to an observation by Tsze et al. (2013) who noted that two commonly used pain rating scales in child health care the Visual Analog Scale and Faces Pain Scale–Revised. However, it disagreed with Gregory and Richardson (2014) who revealed that Numerical Pain Rating Scale was used most commonly in his study on the use of Pain assessment tools in clinical practice. This study established that utilization of pain rating scales in pediatric care is extremely necessary. The revelation concurred with previous studies which have emphasized on the importance of pain measurement tools in pediatric care (Mate 2014, Schellack & Annor, 2016). Mate (2014) emphasized on the importance of pain measurement in children because they may not be able to express it in words though they may be experiencing it.

Utilization of pain rating scale among health professionals at the hospital was mainly supported by health system factors including staff training, facility protocol on pain management and frequent audits of utilization of PRS. Additionally, induction programme, frequent updates, supportive supervision, availability of pain rating scales, and pain management committee were also necessary in the utilization of PRS at the hospital. While most of these factors were noted to be similar to what has been found by other scholars, regular monthly audits of the utilization of pain rating scales and induction programme may be unique health system factors identified in this study. Ehwarieme et al. (2018) in their study on Perceived factors affecting utilization of pain assessment tool among nurses in selected tertiary hospital in Benin noted that seminar/workshop, training of the staff and implementation altitude were factors associated with utilization/non- utilization of pain rating scales. Zahra (2015) noted post graduate training as a factor that influenced utilization of pain rating scales, while Gregory and Richardson (2014) in their study in Europe on the use of pain assessment tools in clinical practice observed that nurses who had been trained on pain, provided good pain management to the patients. Dick et al. (2016) identified Lack of validated age-appropriate pain-measurement tools, and Lack of training on the use and implementation of pain measurement tools as factors that limited utilization of pain rating scales. Olayinka et al. (2018) identified understaffing and

unavailability of pain rating scales as factors associated with non-utilization of pain measurement tools in Nigeria.

Though majority (98%) of health professional were trained on pain assessment, the training did not occur while in school (Occurred while in practice 96.7%). This concurred with zahra (2015) that health professionals in Kenya were not trained on pain assessment during their training in school. This may be an explanation of the challenge attributed to the newly employed health professionals as noted in this study. Difficulties were experienced when new employees were allocated in the wards because they did not know that pain could be assessed and measured using pain rating scales.

While Albertyn et al. (2012) in a study about *Beating Pain* in south Africa listed challenges associated with utilization of pain rating scales as being lack of validated age-appropriate pain-measurement tools, lack of training on the use and implementation of pain measurement tools, lack of knowledge on how to interpret a pain score, Lack of knowledge on how to differentiate between pain, anxiety, and emotional issues such as fear, depression and discomfort, this study has in addition, listed lack of self-drive on documentation of the assessed pain among the nurses as a challenge associated with utilization of pain rating scales. Gregory and Richardson (2014) noted that workload and time available for the health care providers were barriers to utilization of pain measurement tools in Europe. Bawa et al. (2015) 'pointed' at lack of protocols, adequate knowledge and formal training among health professionals as the causes for poorly controlled pain, while Gropelli and Sharer (2013) observed that education of nurses has an impact on appropriate pain management and that the expert nurse is more likely to provide more effective pain management.

While a study in Europe by Gregory and Richardson (2014) on the use of pain assessment tools in clinical practice noted that no pain rating scale was available for use in cognitively challenged patients, Crosta et al. (2014) suggested FLACC as the tool for assessing pain in children who are cognitively challenged. This study has noted a challenge in its utilization in these children. Some of the participants (5.1%)

reported that they experienced difficulties in using FLACC among the mentally challenged patients. They reported that FLACC has caused confusion regarding the age group it should be used for, among the cognitively challenged patients. It was not clear if FLACC could also be used in older children who were mentally challenged, as some health professionals used numerical pain scale to assess for pain in these patients.

5.2 Conclusion

In conclusion, the level of utilization of pain rating scales at the hospital was excellent. However, nurses were the main Health Professionals who utilized them. Their utilization in paediatric care was perceived by the health professionals as extremely necessary. Health system factors including staff training, facility protocol on pain management and frequent audits supported utilization of PRS. Newly employed health professionals and use of FLACC in cognitively challenged paediatric patients posed a challenge in the utilization of PRS at the hospital.

5.3 Recommendation

The researcher recommends the following:

- Inclusion of pain guidelines in all patient's medical records to promote their utilization among other Health Professionals.
- In addition, adoption of pain rating scales in all paediatric settings may be a principle of good care in child health.
- Frequent auditing of utilization of pain rating scales may be used as protocol in paediatric settings which have adopted pain rating scales.
- Inclusion of pain assessment in the curriculum for all institutions training health professionals may address the challenge posed by the newly employed health professionals in utilization of pain rating scales.
- Further research on validity of FLACC in cognitively challenged children may be necessary in this setting.

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APPENDICES

Appendix I: FLACC Scoring.

Face: If there is no facial expression of pain for example if the child has jovial and relaxed face, a score of zero (0) is given.

If there is worried facial expression with partially closed eyes, a score of 1 is given.

If there is notable facial expression of pain which may be shown by completely closed eyes, with deep furrows in the forehead, and an open mouth, a score of 2 is given.

Legs: If there is normal muscle tone of the lower limbs, a score of zero (0) is given.

If limbs are noted to have increased tone with partial extension or flexion a score of one (1) is given.

If the child has hyper-tonicity of the lower extremities with tremors and exaggerated flexion or extension, a score of two (2) is given.

Activity: A score of zero (0) is given if the child has free movement which is normal and without any restrictions.

If the child shifts positions, and demonstrates guarding, appears hesitant to move, and create pressure on a body part, a score of one (1) is given.

If the child demonstrates side-to-side head movement or rubbing of a body part and is in a fixed position, a score of two (2) is given.

Cry: A score of zero (0) is given if the child has no cry, or is asleep.

If the child moans at times, cries, whimpers or sighs, a score of one (1) is given.

If the child has continuous cries or moans, a score of two (2) is given.

Consolability: If the child does not require to be consoled and is calm, a score of zero (0) is given. If the child responds to comfort by touching or can stay for half to one minute, a score of one (1) is given. A score of two (2) is given if the child requires being comforted constantly or is inconsolable.

Appendix II: Consent Form for Health Professionals.

Utilization of pain rating scales in paediatric care among health professionals at Gertrude's children's hospital

Principal investigator: Mbaabu Limungi. Phone no 0788720108

Researcher's statement

Dear participant, my name is Mbaabu Limungi, I am a Masters of Science in nursing student from Jomo Kenyatta University of Agriculture and Technology (JKUAT). I am inviting you to participate in a study I am conducting on "Utilization of pain rating scales in paediatric care among health professionals at Gertrude's children's hospital." This study is part of my course requirement. The study seeks to assess the utilization of pain rating scales among health professionals involved in child health care as a basis for making recommendation for their adoption by the Ministry of Health, Kenya.

You will benefit from this study by having the challenges you experience using pain rating scales forwarded to the hospital management for action. Your participation in this study is on voluntary basis i.e. it is your choice to participate and you may opt out from the study at any stage which will not lead to any form of penalty. However, your participation will be helpful in providing the necessary data needed in this study. You will be required to sign consent before the beginning of the study. You will also be required to fill the questionnaire that may take about fifteen minutes of your time. The information contained in the questionnaire will be confidential. To ensure the confidentiality, your identifications such as names or any other personal particulars that may identify you will not be written on the questionnaire. Identification will be by numbers only. Further, this information will be kept in a password protected computer to ensure that it is only accessed by the researcher.

Please note that your opinion will be respected and considered. I will be available to answer any question that may arise in the course of the study and/ or afterwards i.e. you are free to ask any question or express any concern at any time.

In case of any question or concerns you may contact Mbaabu Limungi (principal investigator) on cell. Phone No. 0788720108. You can also contact the Ethics and Research Committee JKUAT Po box 62000-00200 NAIROBI

Tel 067-5870001

Your participation is highly appreciated.

Thank you.

Mbaabu Limungi (Principal investigator)

Study Participant's statement

I have fully read / was read to me the consent explanation and understood its content. I have been given an opportunity to discuss all my concerns with the researcher. I do therefore agree voluntarily to participate in the study on "Utilization of pain rating scales in paediatric care among health professionals at Gertrude's children's hospital". I also understand that all the information I give will be for the purpose of this study only.

Participant's Signature ----- date -----

Serial number -----

Witness's Signature ----- date -----

----- (Researcher /research assistant)

<p>FOR OFFICIAL USE ONLY:</p> <p>Questionnaire no:</p>

Appendix III: Questionnaire

Utilization of pain rating scales in paediatric care among health professionals at Gertrude's children's hospital.

Instructions

1. Do not write your name on the questionnaire.
2. Answer all the questions.
3. Please tick the right answer where appropriate.
4. If your choice is yes, then proceed to the next question.

PART A: DEMOGRAPHIC DATA

1. What is your gender?
 - a) Male
 - b) Female
2. What is your highest level of education?
 - a) Diploma
 - b) Degree
 - c) Master
 - d) Fellowship
 - e) PhD
3. What is your designation?
 - a) Pediatric Consultant
 - b) Medical Officer
 - c) Nurse
4. Which department do you work in?
OPD Wards ICU HDU Theatre
Others specify.....
5. What is your year of experience in pediatric care?
 - a) 1 year

b) 1-5 years

c) 5-10years

d) Over 10 years

PART B: UTILIZATION OF PAIN RATING SCALES

6. Do you have any pain rating scales in this hospital?

a) Yes

b) No

If yes, which one?

.....
.....

7. Do you use them in assessment and measurement of pain?

a) Yes

b) No

If yes, how often do you use them?

a) Always

b) At times

c) When necessary

8. Do you document the rated pain?

a) Yes

b) No

If yes, where do you document?

a) Vital signs observation chart

b) Nursing cardex

c) Patient case note

d) Others

please

specify.....

9. Among the pain rating scales used in this hospital, do you have preference for any of them?

- a) Yes
- b) No
- a) If yes, which one?
- b) Why do you prefer it?
.....

10. If you were to rate the utilization of pain rating scales in this hospital, on a five (5) point Likert scale. How would you rate it?

- a) Excellent -5
- b) Very good-4
- c) Good -3
- d) Fair-2
- e) Poor-1

11. Are you trained on pain rating scales?

- Yes No

If yes, name the place where training was done

.....

PART C: PERCEPTION ON USE OF PAIN RATING SCALES

12. What is your perception on the use of pain rating scales in measurement of pain in children?

.....
.....

13. Would you encourage the use of pain rating scales in pediatric care?

- Yes No

Why?

14. What advice can you give on the use of pain rating scales in children?

.....

PART D: SYSTEM FACTORS

15. Do you think that your hospital has any contribution on utilization of pain rating scales?

Yes

No

If yes, which one?

a) Induction

b) Continuous medical education (CME)

c) Seminar/workshop

d) Staff training

e) Others please specify.....

16. Have you ever been facilitated by the hospital in regard to the contribution you have named?

a) Yes

b) No

If yes, how many times?

PART E: CHALLENGES ASSOCIATED WITH UTILIZATION OF PAIN RATING SCALES.

17. Have you ever encountered any challenge with pain rating scales in assessment and measurement of pain in children?

a) Yes

b) No

If yes, name them.....

.....
.....

Thank you for your participation.

Appendix IV: Checklist

AGE:

HOSPITAL NO:

ITEM	YES	NO	TOOL USED
Pain rated and documented in Neonates			
Pain rated and documented in Infants			
Pain rated and documented in Toddlers			
Pain rated and documented in Pre School Children			
Pain rated and documented in School Going Children			
Pain rated and documented in Adolescents			

Appendix V: Key Informant Interview Guide

Welcome Remarks: Introduction of Principal Investigator.

Our topic of discussion is “**Utilization of pain rating scales in pediatric care among health professionals at Gertrude’s children’s hospital**” This discussion offers an opportunity to assess the utilization of pain rating scales in pediatric care among health professionals at the hospital. This will enhance improvement in assessment and measurement of pain for pediatric patients. You were selected because you are among the key informants in the field of pediatric care and that you are the unit manager.

Confidentiality

All the information you will provide will be confidential. I will not use your name, address, or any other identifying information in reports or other materials related to this study.

Opening questions:

- Tell me about your experiences in assessment and measurement of pain in child health care.
- Kindly comment on the utilization of pain rating scales by your staff.
- Are all your staff trained on pain measurement tools?
- What is your perception and that of your staff on the utilization of pain rating scales in child health care?
- How does the hospital ensure that your staff are utilizing Pain rating scales?
- Do you experience any challenges regarding utilization of pain rating scales in this hospital?
- What would be the single most important change you would suggest to be improved regarding pain rating scales in child health care?
- Is there anything else you would like to add?
- Are there any questions that I can answer before we end the session?

Thank your participation.

Appendix VI: Confidentiality Agreement Form

Utilization of pain rating scales in pediatric care among health professionals at Gertrude’s children’s hospital.

I.....the research assistant have been hired to assist in data collection. I agree to:

1. Keep all the research information shared with me confidential by not discussing or sharing the research information in any form or format with anyone other than the researcher.
2. Keep all research information in any form or format secure while it is in my possession.
3. Return all research in any form or format to the researcher when I have completed the research task.
4. After consulting with the researcher erase or destroy all research information in any form or format regarding this research project that is not returnable to the researcher.

Name.....

Signature.....

Date.....

Researcher

.....

Signature.....

Date.....