

**THE PERCEPTIONS OF HEALTH CARE PROFESSIONALS REGARDING THE
ROLE OF PHYSIOTHERAPY IN MANAGEMENT OF UPPER LIMB FRACTURES IN
CHILDREN AT SOLWEZI GENERAL HOSPITAL IN ZAMBIA**

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**This thesis submitted in partial fulfilment of the requirements for the degree of Masters in the
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KEY WORDS

Physiotherapy

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Complications

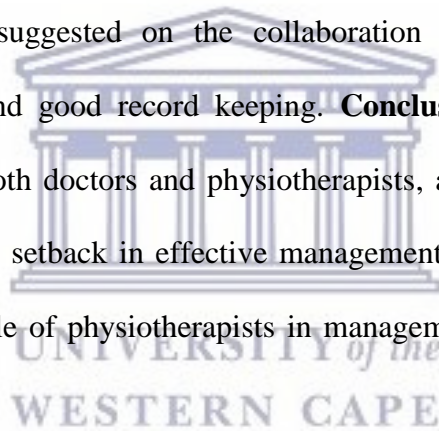


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ABSTRACT

Background: Upper limb fractures occur in a population of different age groups but are more common in children. According to literature, upper limb fractures are mainly caused by a fall on an outstretched hand, and if not managed properly can result in complications that may lead to disability. Risk factors such as running, playing, genetic factors and poor nutrition are the major contributors leading to upper limb fractures in children. There is inadequacy of current literature relating to the incidence of children presenting with upper limb fractures in children in Zambia, in relation to many studies done in other Africa countries. **Aim:** To determine and explore the perceptions of health care professionals regarding the role of physiotherapy in management of upper limb fractures in children during the period of 1 January 2012 -31 December 2014. **Study design:** A sequential mixed methods approach was employed. A retrospective descriptive design was used for the quantitative phase and an exploratory design for qualitative phase of the study. Total population sampling with a convenience sample of the medical records of children who sustained upper limb fractures from 1 January 2012 to 31 December 2014 was employed. **Data analysis:** Quantitative data was analysed using SPSS version 22. Descriptive statistics was employed to summarise socio-demographic data and is presented in graphs, tables and charts using frequencies and percentages. Inferential statistics (Chi-square tests and student t-tests) was employed to determine any association between variables. Significance was set at a p value < 0.05. Qualitative data was audio-taped and transcribed verbatim followed by thematic analysis. **Ethics:** Approval was sought from the University of the Western Cape's Senate Higher Degrees Committee. Further permission was sought from Research and Ethics Department in Zambia and the Medical Superintendent of Solwezi General Hospital. The participants were made aware of the aim of the study, confidentiality and their freedom to withdraw from the study. **Results:** A

total number of 385 children with upper limb fractures were managed during the period under review. The findings of the study showed that the majority of the participants were aged 0-9 years old (72.2%) and 10-14 years old (27.8%) The mean age of the patients was 8 years old, and the majority of the participants (66.2%) were male. With regard to the qualitative phase, four doctors and five physiotherapists working at Solwezi General Hospital were conveniently sampled to explore their perceptions on the role of physiotherapy in the management of upper limb fractures in children. Doctors were aware of the role of physiotherapists in management of upper limb fractures in the children. They also identified shortcomings on the side of physiotherapists' in terms of lack of communication and attendance during ward rounds. On the other hand, physiotherapists suggested on the collaboration on team work, case studies, consistency in management and good record keeping. **Conclusion:** The study succeeded in exploring the perceptions of both doctors and physiotherapists, although it was concluded that poor communication led to the setback in effective management which needs to be addressed. However, awareness on the role of physiotherapists in management of upper limb fractures in children was known.



DECLARATION

I hereby declare that “**The perceptions of health care professionals regarding the role of physiotherapy in the management of upper limb fractures in children at Solwezi General Hospital in Zambia**” is my own work, that it has not been submitted for any degree of examination in any other university and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

Louise Mubanga

Signature:

January 2017

Witness:

.....

Dr. Tania Steyl



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DEDICATION

This thesis is dedicated to my family who has always been there for me, especially my mum Victoria Mubanga, who gave me the strength to go on and encouraged me to press on towards my goals. To my late dad, Francis Mubanga, just the thought of you kept me going. I just want to say “**I DID IT**”. I will forever hold on your words which say “**There is nothing difficult in this world; the secret is just hard work.**”

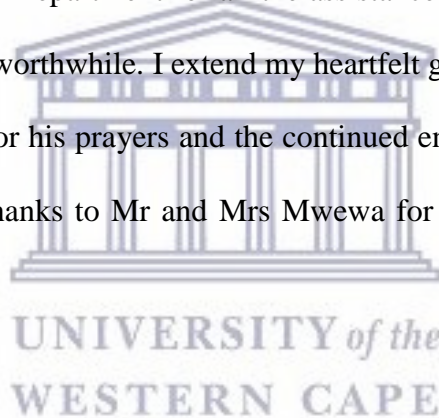


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Special thanks go to Solwezi General Hospital for according me the chance to carry out my research, and the Physiotherapy Department for all the assistance rendered to me, they made my research experience easier and worthwhile. I extend my heartfelt gratitude to Pastor Jacob Ntuntu from Bread of Life Kalulushi for his prayers and the continued encouragement to go further and for trusting in me. Words of thanks to Mr and Mrs Mwewa for being my spiritual inspiration. May God bless you all.



Special thanks to my dearest mum for all the trust and confidence in me. To my family Keith, Keegan, Lorraine, Dalitso, Mulindwa, Chiziko and Joe, thank you guys for the unwavering support, love and encouragement. Big ups to my sweet niece Nitike who kept telling me to finish fast and get back home. Love you so very much and may the Lord continue blessing you.

Special thanks to Chabinga, Kassim, Nephtalie, Emmanuel and all the people that supported me throughout this journey. You gave me the strength to go on. I will forever be grateful. I must say it was not easy but it was worth it. May the LORD always favor you all.

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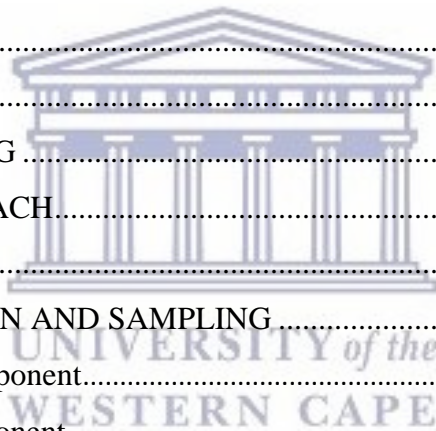
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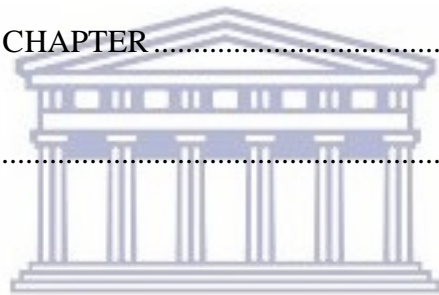
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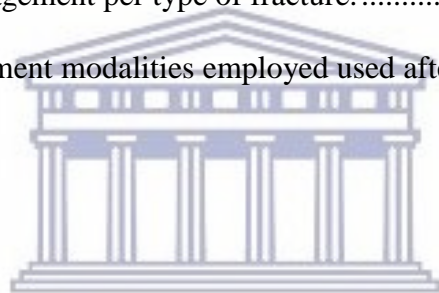
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LIST OF ABBREVIATIONS

ADL:	Activities of daily living
APA:	Australian Physiotherapy Association
BMD:	Bone mass density
BMI:	Body mass index
CSP:	Chattered Society of Physiotherapy
ICF:	International Classification of Functioning, Disability and Health
ORIF:	Open reduction internal fixation
POP:	Plaster of Paris
QOL:	Quality of life
RTA:	Road traffic accidents
SPSS:	Statistical Package for Social Science
USA:	United States of America
UTH:	University Teaching Hospital
WCPT:	World Confederation of Physiotherapy
WHO:	World Health Organisation
ZSP:	Zambia Society of Physiotherapy



CHAPTER ONE

INTRODUCTION

1 INTRODUCTION

The present chapter provides information relating to the background and the overall aim of the study. The objectives used to address the aim are specified and the significance of the study is explained. The definition of the terms used in the study is provided together with an overview of the chapters of the thesis.

1.1 BACKGROUND AND RATIONALE

Upper limb fractures occur in a population of different age groups, but are more common in children due to the physical and chemical difference in the bone make up, periosteum and the presence of growth plates (Rowland & Baird, 2014). The study conducted by Rennie, Court-Brown, Mok and Beattie (2007) in South Wales on comparative epidemiological data showed that children are more prone to fractures of the upper limbs than adults, with an incidence of 20.2 per 1000 in children and 11.1 per 1000 in adults. This variability may depend on the child's condition, age, social and environmental factors. A Turkish study conducted by Issin, Kockara, Oner and Sahin (2015) reported that the upper limb fractures accounted for 81% of all paediatric fractures with the common being the distal radius with 24.6%, with boys being more affected than girls.

In a Swedish study, Van Staa, Cooper, Leufkens and Bishop (2003) reported that the annual overall incidence rates of upper limb fractures was 257 per 1000 among boys and 165 per 1000

among girls. The effects of pediatric fractures are considerable with significant restriction of activity. Edwardson, Murray, Joseph and Duncan (2013) stated that 95% of upper limb fractures in children are as a result of a fall on outstretched hand with a fully extended elbow, which is meant to prevent them from falling. Daly and Petit (2007) reported several factors such as bone mass and bone mineral density, low calcium intake, high body mass index (BMI), inactivity, behavioral difficulties and consumption of carbonated beverages that could contribute to upper limb fractures in children. Carter, Bertrand and Cearley (2013) reported that fracture patterns depend on a specific age group. Fracture patterns such as greenstick, distal forearm and radial head and neck fractures are common in children aged 3 - 10 years old, with the most common being supracondylar fractures. A study by Temple, Bache and Gibbons (2006) shows that upper limb fractures in children are common in the distal radial metaphysis, proximal humerus, shaft or the distal humerus (supracondylar ridges, medial and lateral epicondyles) followed by fractures of the elbow. However, supracondylar fractures are the most common and the most challenging with the highest complication rate, followed by lateral humeral condylar fractures (Kraynov, 2016).

According to Valerio et al. (2010) the risk of sustaining a fracture in childhood lifetime is approximately 42% - 64% in boys and 27% - 40% in girls, with significant variation in the estimates globally. Boys are more vulnerable than girls, due to being more involved in high risk physical activities (Muriu, 2016).

The elbow is more frequently injured in childhood than in later life, with a peak incidence between the ages of 5 and 10 years old. The elbow is critical in the functional movement of the

arm, and any problem in this region of the body can have a serious impact on the quality of life activities (MacDermid et al., 2012). According to the Slocum Centre for Orthopaedics and Sports Medicine (2007), limited range of motion in the elbow will affect the ability of the elbow and upper arm to function correctly. Disability in the International Classification of Functioning, Disability and Health (ICF) serves as an umbrella term for impairment, activity limitation and participation restrictions (WHO, 2001). It can also be defined as a physical, mental, or psychological condition that limits a person's activities. According to the WHO International Classification of Function, Health and Disability (ICF), disability leads to activity limitation and participation restriction. Mont (2007) stated that people are not classified as having a disability based upon a medical condition, but rather according to a detailed description of their functioning within various domains of body structure and function. Environmental and personal factors also act as a barrier for children with fractures as they may find normal activities such as using the affected hand in writing, feeding, dressing, as well as participating in sports challenging and may end up being a burden to other people. The children could also become psychologically affected when their deformity or limited ability to use their limb prevent them from doing activities with other children (Conroy, Conroy & Newman, 2006).

When fractures are not properly managed, complications arise which in turn affects children in their activities of daily living (Joeris, Lutz, Wicki, Slongo & Audigé, 2014). Temple et al. (2006) further suggested that it is important that injuries are diagnosed, managed and treated appropriately to reduce associated complications and ensure best functional outcomes. Management of fractures involves a multi-disciplinary team, namely the surgeon, physiotherapists, radiologists, nurses and occupational therapists to achieve the best possible

result. Physiotherapy plays a major role in the management and rehabilitation of fractures. Fracture management involves both conservative and surgical treatment and must be based on the choice of the severity of the injury (Kraus & Wessel, 2010). The goals of management are to assist with healing of the fracture site, to preserve the function of the affected limb and to prevent the development of complications (Hussain, Ahmad & Waqas, 2010). Fractures can be managed conservatively with a Plaster of Paris and arm sling in cases where there is no displacement of the fracture. Surgical intervention happens when there is a severe displacement of the bone fragments (Dawood et al., 2015). Complications such as infection, joint disruption, mal-union and adhesions may arise after the operation (George, Kattoor & Edayalamuriyil, 2016).

1.2 PROBLEM STATEMENT

For the past few years of working at a district hospital in Solwezi, the researcher noticed a significant number of upper limb fractures among children between the ages of 0 and 14 years old resulting in a number of disabilities amongst some of the children. Prevention of such disabilities demands the attention of health professionals, including physiotherapists, which could play an important role in the management of children with fractures to ensure a better quality of life. In addition, the researcher also noted a non-coordinated approach amongst health care professionals in the management of these fractures. Furthermore, access to health services in Zambia is not equitable for people living in the remote rural parts of the country, while a great variation exists in patient management strategies of government and mission hospitals (Ministry of Health, 2000). All the above mentioned could lead to associated complications and poor functional outcome for the children with upper limb fractures.

1.3 AIM

The overall aim of the study is to compile a patients' profile and explore the perceptions of health care professionals regarding the role of physiotherapy in the management of upper limb fractures in children at Solwezi General Hospital, Zambia.

1.4 SPECIFIC OBJECTIVES

1. To establish a profile of patients admitted with upper limb fractures at Solwezi General Hospital, Zambia.
2. To describe the process of care of patients with upper limb fractures (both medical and physiotherapy management) at Solwezi General Hospital, Zambia.
3. To explore the perceptions of doctors regarding the role of physiotherapy in the management of upper limb fractures in children at Solwezi General Hospital, Zambia.
4. To explore the perception of physiotherapists regarding their role in the management of upper limb fractures in children at Solwezi General Hospital, Zambia.

1.5 SIGNIFICANCE OF THE STUDY

The study could enlighten physiotherapists regarding the role they could play in the management of children with upper limb fractures, assisting in the reduction of disabilities among these patients. In addition, all health care professionals managing children with upper limb fractures could see the importance of engaging in multi-disciplinary rehabilitation practices to reduce the development of secondary complications and disability that could negatively influence the children's' quality of life. Furthermore, the results of the study could be a guiding source of

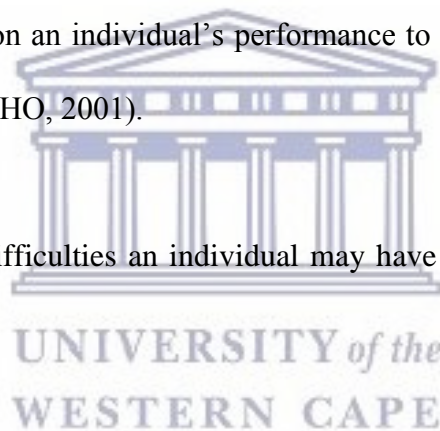
information to the government or decision-makers when enacting policies regarding the management of upper limb fractures in children in Zambia.

1.6 DEFINITION OF TERMS

Disability in International Classification of Functioning, Disability and Health (ICF) serves as an umbrella term for impairment, activity limitation and participation restrictions (WHO, 2001).

Environmental factors are defined as the makeup of a physical, social and attitudinal environment in which people live and conduct their lives. These factors are external and have a negative or positive influence on an individual's performance to execute actions or tasks on the body's function or structure (WHO, 2001).

Activity limitations refer to difficulties an individual may have in executing activities (WHO, 2001).



Participation restriction is defined as any problem an individual may experience in involvement in life situations (WHO, 2001).

Prevalence refers to the number of cases of a disease or condition at a particular point in time in relation to a certain population (WHO, 2002).

Perceptions is an opinion or belief held by people and based on how things seem (Cambridge Advanced Learner's Dictionary, 2014).

Physiotherapy is a profession that assists to restore movement and function when someone is affected by injury, illness or disability (Chartered Society of Physiotherapy, 2013).

1.7 OUTLINE OF CHAPTERS

Chapter One outlines the background and rationale of the study, the problem statement, research question; study aim, objectives and the significance of the study is highlighted as well. Finally, the chapter provides the outline of the chapters of the thesis.

Chapter Two entails the review of the literature to conceptualize the present study. Literature relating to fractures, incidence and prevalence, risk factors, complications and impact of upper limb fractures are reviewed and documented on. The management of both medical and physiotherapy is reviewed and presented.

Chapter Three describes the methodology that was applied to perform this study, including the research setting, study design, population and sampling, study instrument, study procedures, data analysis methods and the ethical considerations.

Chapter Four outlines the results of the quantitative part of the study. Descriptive statistics are used to describe the results in terms of frequencies, means, ranges and standard deviation using tables, graphs and pie charts. Chi square tests are used to indicate the association between variables.

Chapter Five presents the qualitative results of the interviews that attempted to explore the perceptions of physiotherapists and doctors regarding their role in the management of upper limb fractures in children. The pre-determined and emerging themes are illustrated with the use of verbatim quotes.

Chapter Six presents the discussion of the quantitative and qualitative results. It furthermore provides a summary of the study and draws conclusions based on the findings. The chapter further integrates literature identifying the comparisons and differences while ordering the gaps for future studies. Limitations to the study are also outlined. The recommendations based on the main findings of the study are made.



CHAPTER TWO

LITERATURE REVIEW

2 INTRODUCTION

This chapter primarily explores the concepts relating to the prevalence and incidence of upper limb fractures, risk factors, possible complications and the impact of fractures on activities of daily living (ADLs) and quality of life (QoL) in children. In addition, the literature regarding the medical and physiotherapy management of fractures are reviewed.

2.1 PREVALENCE AND INCIDENCE OF UPPER LIMB FRACTURES IN CHILDREN

All over the world, trauma has been seen as the leading cause of morbidity, mortality and disability in childhood, with the most important component being fractures (Admassie, Ayana & Girma, 2015). A study by Tandon, Shaik and Modi (2007) stated that 42% of injuries found in the USA were upper limb fractures. A retrospective study on paediatric fractures in Edinburgh, Scotland showed that sixty one per cent (61%) of fractures seen in children were upper limb fractures (Rennie et al., 2007). A study conducted in Pakistan by (Dawood et al., 2015) showed that upper limb fractures accounted for 73% of all the fracture cases.

Studies conducted in Pakistan by Mansoor, Shahnawaz, Ahmad, Arif and Hamza (2015) reported that fractures are a common and significant injury in childhood, but information is scarce in developing countries about the pattern of fractures among children. The results showed that 43% of the population are children less than 5 years old, but there is limited data regarding how, when and why fractures occur. An Italian study by Valerio et al. (2010) indicated that males were at a

higher risk of fractures than females, with more than two-thirds of injuries occurring as a result of low-energy trauma, involving the upper limb more frequently. Gender differences in the incidence of fractures in the paediatric age group are well-known. The overall percentage of children least sustaining one fracture is higher in boys (64%) than girls (40%) and the peak incidence is roughly three (3) years earlier in girls than in boys (Joeris et al., 2014).

Children are at a high risk for distal radius fractures due to a rapidly developing skeletal structure as well as them being explorative in play as they are growing. Studies have documented that up to 25% of fractures in children in Asia involve the distal end of the radius (Issin et al., 2015). A study by Landin (1997) estimated that until the age of 16, the risk of sustaining a fracture is 42% in boys and 27% in girls. In the researcher's analysis, fractures of the distal forearm accounted for approximately 21% of all fractures in the paediatric population. Over the past 40 years, the incidence of distal radius fractures in children appears to be rising, but it is difficult to describe the precise cause. Studies conducted by Nellans, Kowalski and Chung (2012) suggested that this could be the result of an overall increase in the participation of sport-related activities in the paediatric population. Some studies also suggest this could be the result of an overall increase in the participation of sport-related activities in the paediatric population. Randsborg (2013) also found that an increase in sport-related activities correlated with an increase in distal radius fractures which accounted for 31.1% of all fractures types. Rennie et al. (2007) stated that in the United Kingdom, road traffic accidents accounted for 7% of paediatric fractures which was half the incidence (13.4%) found in South Africa.

Africa is not spared the burden of paediatric fractures. Sub-Saharan Africa seems to be excessively affected because of sub-standard practical abilities and a difficult socio-cultural environment. The problem is more acute in paediatric populations as little or no special attention is usually paid to this particularly vulnerable group of the population. Estimates show that 95% of all childhood injuries occur in low income settings (Simon, Gilyoma, Dass, McHembe & Chalya, 2013). A Singapore study conducted by Ong, Low and Vasanwala (2016) reported that fractures are a major problem and cause of child morbidity. The most frequent age group affected is 6 to 10 years old, with the supracondylar fracture being the most prevalent. In a study of the patterns of fractures and dislocations conducted in India by Awasthi et al. (2016), it was stated that most of the injuries resulted from falls and road traffic accidents respectively.

A study in Nigeria by Agaja and Ehalaiye (2009) reported that road traffic accidents were responsible for 20 - 40 % of the fracture cases. An Ethiopian study by Admassie et al. (2015) highlighted that most upper limb fractures were caused by falls which accounted for the largest proportion (72.6%), followed by road traffic accidents (17.5%), with the most common fractured bone being the humerus. In Zambia, Mulla and Lungu (2002) reported that over 80% of the children sustain fractures of the upper limbs. On the other hand, Krabbe, Rutten, Phiri and Heiji (2003) reported that little is known about the prevalence of paediatric limb fractures in rural African children. In this retrospective population survey of 355 participants in Katete, Zambia, a fracture prevalence rate of 15-19% in male and 11% in female was reported.

The situation is not different in South Africa, as Thandrayen, Norris and Pettifor (2009) reported a prevalence of fifty seven per cent (57%) for upper limb fractures in children. These fractures

came as a result of road traffic accidents and falls from heights and playing. According to the Child Accident Prevention Foundation of South Africa, Child safe (2010), children sustained 39% of injuries of which 73% was the upper limb fractures. It is important to notice that the prevalence and gender dissimilarities in above mentioned studies could be due to methodological differences and outcome measure variance used in the studies.

2.2 RISK FACTORS OF UPPER LIMB FRACTURES IN CHILDREN

Fractures are caused by a combination of intrinsic and extrinsic factors that vary with age. A study by Valerio et al. (2010) regarding the risk factors contributing to fractures of the upper limb in children named slips, trips and activities such as running, walking, climbing and general playing with other children as risk factors. It was also noted that fractures in children due to a simple fall from a low bed contributed to 50% of upper limb fractures of the radius and ulna. The majority of childhood falls occur in the lower middle-income countries. Admassie et al. (2015) found that the majority of fractures were due to falls, followed by road traffic accidents, which is in agreement with several studies (Simon et al., 2013; Rennie et al., 2007). However, Pretorius and Firth (2010) accounted road traffic accidents to be the major cause of paediatric fractures.

Most paediatric fractures occur outdoors. Younger children are at particular risk of sustaining fractures on playgrounds, while older children tend to sustain fractures during recreational and organised sports (Joeris et al., 2014). A population based study on the epidemiology of fractures in children found that sports and play activities contributed to most fractures of the upper limbs, with the distal forearm being the common site (Hedström, Svensson, Bergström & Michno, 2010). Simon et al. (2013) described traffic related injuries as a factor for trauma.

Studies on the epidemiology of childhood fractures suggest that some fractures in children are related to sporting activities, many of which may involve vigorous physical activity. Although vigorous physical activity or contact sports participation probably increases bone mass, it was suggested that increased numbers of injuries, also increases fracture risk (Caine, Maffulli & Caine, 2008). Blunt trauma, is a risk factor common in older children accounted for 20% of fractures and included assaults, crush injuries, direct blows and hyper flexion/extension injuries (Rennie et al., 2007).

Clark, Ness, Bishop and Tobias (2006) stated that decreased bone mineral content, bone size and bone growth are evident in apparently healthy children and adolescents with fractures. Decreased bone mineral density is a predictor for a new fracture. Evidence shows that genetic factors, poor nutrition (including an inadequate intake of dietary calcium, milk avoidance and excessive consumption of carbonated beverages), lack of weight-bearing physical activity, obesity and high exposure to trauma may influence fracture risks in the general paediatric population (Valerio et al., 2012). There is evidence showing that children with lower-than average bone mass density (BMD) had a higher fracture rate and new reports suggest that forearm and wrist fractures are associated with low bone density in children (Clark, 2014). Asthma and adverse reactions to cow's milk was also found to be risks factors for fractures. A population-based case-control study by on the association between the use of soft drinks, milk consumption, physical activity, and bone mass and upper limb fractures was investigated in 206 children with fractures and 206 matched controls. A positive association was found between wrist and forearm fractures and cola drinks consumption, but the association was weak and apparently intervened by low physical activity and low body mass density (Bianchi, 2007).

Age and sex are other determinants of risk in children fractures. An ethnical population study was conducted on the risk factors of upper limb fractures in children. The researchers reported that because of population differences in growth, calcium intakes, and socio-economic conditions, mixed ancestral children would have lower bone mass compared to Black and White children. Micklesfield et al. (2007) further stated that there is a higher physical activity risk factor in South African White than Black children, while Black people have a higher genetic protective factor.

2.3 COMPLICATIONS AND THE IMPACT OF UPPER LIMB FRACTURES IN CHILDREN

Fractures result in temporary activity limitation and can sometimes lead to permanent disability. According to the WHO (2001), disability is an umbrella term representing the dynamic interaction between the person and the environment. Disability is the outcome of the interaction of the person and their environment and thus is neither person nor environment specific. Mont, (2007) stated that people are not identified as having a disability based upon a medical condition, but rather are classified according to a detailed description of their functioning within various domains which is the body structure and function. Mont (2007) further stated that the ICF incorporates the social model by including information on how a person's ability to function is affected by the environment they live in. For example, a given level of impairment in the body function domain will not necessarily translate into an activity or participation limitation if the environment accommodates a person's different functional status.

There are a number of complications that may arise as a result of fractures. Mal-union may lead to osteoarthritis as a result of abnormal distribution of load leading to early degenerative change.

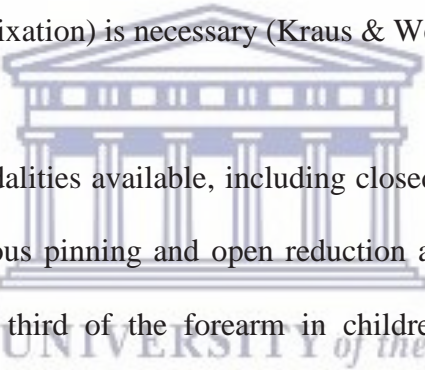
Avascular necrosis is a late complication that may take two years to develop. If a fracture interrupts the blood supply to the bone, the affected bone will die, collapse and the joint is destroyed, leading to pain and stiffness (Tahir, Majid, Ali & Qureshi, 2012). Iatrogenic nerve injury, Volkmann's ischemic contracture, cubitus varus deformity, elbows stiffness and myositis ossificans are also complications that could develop after an upper limb fracture (George et al., 2016).

The impact of upper limb fractures on children's activities of daily living (ADL) depends on their age and gender. Activities pertain to a wide range of deliberate actions performed by an individual, as opposed to particular body functions or structures. Activities are basic deliberate actions undertaken in order to accomplish a task, such as getting dressed or feeding oneself (Mont, 2007). Participation refers to activities that are integral to economic and social life and the social roles that accomplish that life, for example, being able to attend school and doing school activities such as writing, participation in sports activities like soccer, swimming and gym classes. Children become psychologically affected in the sense that they cannot perform their usual leisure time activities and also to attend school (Conroy et al., 2006). Immobilisation in a cast for several weeks may prevent the child from performing many activities of daily living and that the function affected were personal hygiene, self-dressing, making a snack, and reaching a high shelf (Aviv, Bar-On, Weigl, Becker & Katz, 2008) Although most fractures in children heal without loss of function, Randsborg (2013) stated that children suffer in form of pain, hospitalisation, time away from school and reduction of activity for weeks to months.

2.4 MANAGEMENT OF UPPER LIMB FRACTURES IN CHILDREN

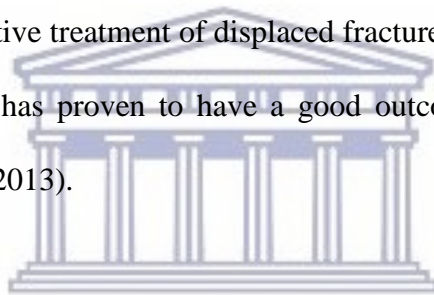
2.4.1 Medical management

Fractures are managed both surgically and conservatively. During fracture management, a multi-disciplinary team should be involved in order to come up with a proper management strategy. This includes a surgeon; a radiologist, nurse, physiotherapist and an occupational therapist (Bushby, Finkel & Birnkrant, 2010). During conservative management, a plaster back slab or Plaster of Paris (POP) is used while surgical management (open reduction) is used for displaced fractures. If reduction is necessary, a selection of manipulation techniques must be done that would not involve any risk of re-displacement. If this is not possible with immobilisation alone, operative stabilisation (internal fixation) is necessary (Kraus & Wessel, 2010).



There are various treatment modalities available, including closed reduction and plaster casting, closed reduction and percutaneous pinning and open reduction and internal fixation (ORIF) to manage fractures in the distal third of the forearm in children (Rowland & Baird, 2014). However, van Egmond, Schipper and van Luijt (2012) demonstrated that operative intervention is used when acceptable alignment cannot be achieved or maintained. Complicated fractures such as the supracondylar fractures of the humerus need a specific treatment in order to obtain a satisfactory result because of the low bone remodelling associated with these injuries. Displaced supracondylar fractures of the humerus are challenging injuries to treat and it causes technically difficult procedures for orthopaedic surgeons (Carter et al., 2013) According to Erçin et al. (2016) closed reduction and percutaneous pinning are the approach which is preferred when it comes to the management of displaced paediatric supracondylar fracture of the humerus. However, this technique requires experience and it is not free of complications.

Unless a specific indication for open reduction is present, a closed reduction should always be attempted first (Pretell-Mazzini, Rodriguez-Martin, Aun~on-Martin & Zafra-Jimenez, 2011). According to Alam, Shah and Jan (2014), due to the remodelling potential and some degrees of residual fixed angular deformity in the distal fractures, a closed reduction and cast immobilisation should be done to avoid functional loss of forearm rotation. However, Rahman et al. (2011) reported that though re-displacement is prevented by the use of percutaneous wiring, operative interventions are used for open fractures. However, the suggested modality used in distal forearm fractures is closed reduction and cast immobilisation. Different techniques for ORIF have been reported, but crossed pinning with post-operative immobilisation is the preferred technique. Non-operative treatment of displaced fractures has been replaced by fracture stabilisation with wires and it has proven to have a good outcome (Salonen, Pajulo, Lahdes-Vasama, Valipakka & Mattila, 2013).

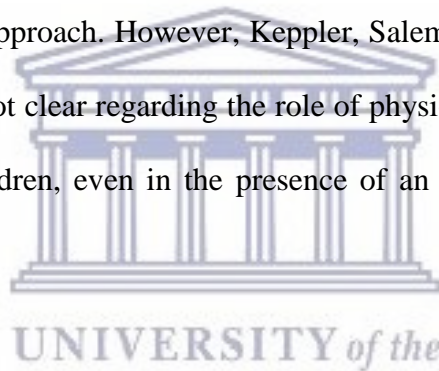


2.4.2 Physiotherapy management

A study conducted by Kraus and Wessel (2010) suggested that rehabilitation is aimed at decreasing pain, minimising inflammation and oedema, increasing pain-free range of motion, strengthening and improving the general condition, increasing coordination and flexibility and prevention of further complications. Physiotherapy also focuses on pain reduction, healing, rapid recovery of mobility, and avoidance of late complications. An individually tailored physiotherapy rehabilitation programme is required for each patient. The content of the rehabilitation programme should be patient specific (Bruder, Taylor, Dodd & Shields, 2013).

Passive and active motion, soft tissue stretching techniques, and strengthening exercises should be implemented to maximise functional outcome (MacDermid et al., 2012).

Furthermore, physiotherapy ensures that patient education focuses on instructing parents on how to monitor the child's neurovascular status, recognize signs of compartment syndrome, and skin care around the cast (Vigneron, 2014). The World Confederation for Physiotherapy (2011) records that physiotherapy should commence as soon as possible after limb fractures to restore full joint movement and functional ability. Passive interventions involves the patient taking a passive role during its application, such as passive joint mobilisation, while active interventions involves exercises and advise. A study conducted by Bruder, Shields, Dodd, Hau and Taylor (2016) stated that physiotherapy uses active interventions such as teaching a home exercise programme and providing advice, which promotes the patients' independence through the use of a self-management approach. However, Keppler, Salem, Schwarting and Kinzl (2005) indicates that the literature is not clear regarding the role of physiotherapy in the management of supracondylar fractures in children, even in the presence of an active or passive limitation of elbow joint motion.



Research highlights that children could benefit from post-fracture physiotherapy to address the complication of elbow stiffness. Keppler et al. (2005) argued that the usual post-operative immobilisation period can be reduced to three (3) to four (4) weeks therefore free elbow range of motion can be easily achieved. MacDermid et al. (2012) recommended physiotherapy for elbow stiffness. de Neira, Prada-Cañizares, Marti-Ciruelos and Pretell-Mazzini (2015) conducted the largest prospective study on elbow recovery motion in children. It was found that there was flexion, extension and relative arcs of motion after the removal of the cast and no physiotherapy was used. It was found that physiotherapy was not effective in restoring elbow motion even after closed reduction and pinning.

The duration of external immobilisation after open reduction and Kirschner wire stabilisation of supracondylar humeral fractures is an important variable that affects joint mobility. In children the usual five (5) to six (6) week postoperative immobilisation period can be reduced to three (3) to four (4) weeks, therefore restoring free elbow range of motion sooner. Patients with a supracondylar fracture should perform pain-free flexibility and strengthening exercises as part of their rehabilitation to ensure an optimal outcome. This is particularly important, as soft tissue flexibility and strength are quickly lost with immobilisation (Jones, 2016).

In addition, Vigneron (2014) showed a significant difference in the grade of joint stiffness at the beginning and the end of physiotherapy, including a complex of various therapeutically physical procedures which could improve the range of motion of the elbow joint. On the contrary, physiotherapy in the paediatric population is not advised and even is counter-indicated due to the fact that the child will start moving and using its arm. According to Keppler et al. (2005), children have the urge for movement especially between 5 and 10 years of age. Therefore no joint mobilisation measures are necessary in this age group because children automatically move their elbow joint until pain follows.

2.5 DOCTORS' PERCEPTIONS REGARDING THE ROLE OF PHYSIOTHERAPY IN THE MANAGEMENT OF UPPER LIMB FRACTURES

Literature suggests that the most common perception doctors have of the role of the physiotherapy profession might be that of the treatment of sports injuries. Yet, physiotherapists treat a wide range of physical conditions, including musculoskeletal conditions such as upper limb fractures in all age groups (Puckree, Harinarain, Ramdath, Singh & Ras, 2011). This is echoed by Acharya et al. (2012) who states that physiotherapists not only treat patients with

neurological, cardiac, pulmonary and musculoskeletal conditions but also they manage paediatrics condition like upper limb fractures. It is also imperative to mention that physiotherapists work within the multi-disciplinary health and social-care teams in the management of varying health problems and also have a key role to play in health promotion, health education and self-care to maximise an individuals' independence and well-being.

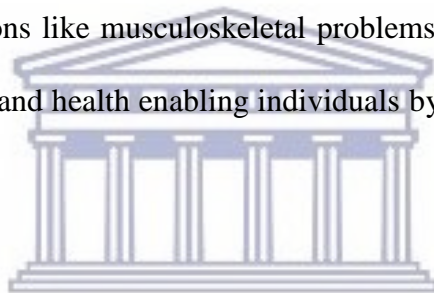
In most developing countries in Africa, including Zambia, physiotherapists are not first line practitioners and therefore patients need a referral from a physician. Physicians have a profound influence on other health professions, including physiotherapy as they are the one that have to refer a patient to the physiotherapist. Globally, it has been a great concern on the fact that physicians prescribe physiotherapy to patients (Abichandani & Radia, 2013). Physicians must understand the principles and methods that physiotherapists use. With the understanding, a physician can appropriately include treatment modalities and comprehensive diagnostic and treatment planning (Ramli, 2003). However, having this information is not enough as clear and frequent communication between therapists and physicians is of utmost importance to plan proper management or rehabilitation. If a physician does not have an ideal perception of what the physiotherapists' role entails in the management of conditions such as upper limb fracture among children, the available skills and services of physiotherapy could be under-utilised, hampering optimal management.

Odebiyi, Amazu, Akindele, Igwe and Olaogun (2010) stated that there has been a great concern of physiotherapy prescription by physicians globally. Unfortunately, these prescriptions are often wrong, suggesting poor perception of the physiotherapy profession. There can be false

impression about the profession which can lead to a poor perception. Thus, the researcher proposed that a good perception of the role of physiotherapy in management of such conditions as upper limb fractures may help foster good management skills.

2.6 PHYSIOTHERAPISTS' PERCEPTION REGARDING THEIR ROLE IN THE MANAGEMENT OF FRACTURES

Melnick (2016) on the World Confederation of Physical Therapy (2002) mentions that physiotherapy is aimed at finding and maximising movement potential, through promotion, prevention, treatment and rehabilitation. Childs et al. (2005) states that physiotherapy plays in a role in management of conditions like musculoskeletal problems by maintaining, restoring, and improving movement, activity, and health enabling individuals by having an optimal functioning and quality of life.



2.7 THEORETICAL FRAMEWORK OF THE STUDY

2.7.1 The ICF Framework

The theoretical framework was the International Classification of Functional Disability and Health (ICF). The ICF was agreed upon by the World Health Organisation (2001). The ICF create a scientific basis for understanding and studying health, injury and health-related states, outcomes and their determinants (WHO, 2001). The framework consists of two parts (*Figure 2.1*), the *Functional and Disability* part with three components of health: body functions and structures, activities and participation. The second part comprises the *Contextual Factors* including the environment and personal factors. The ICF has been adopted in the management of children because of the emphasis it stresses on the components of health and personal factors like perception as important determinants of health. It also provides an understanding for functioning

and disability based on the bio-psychosocial perspective of life (WHO, 2001). The framework guides on how disability lead to functional limitations among the affected children and how it interferes with the general environment in which the child thrives. The framework was also greatly guided by literature in order to establish the demographic and clinical characteristics and the perceptions that are henceforth created in the physiotherapy management of these fractures (Figure 2.1).

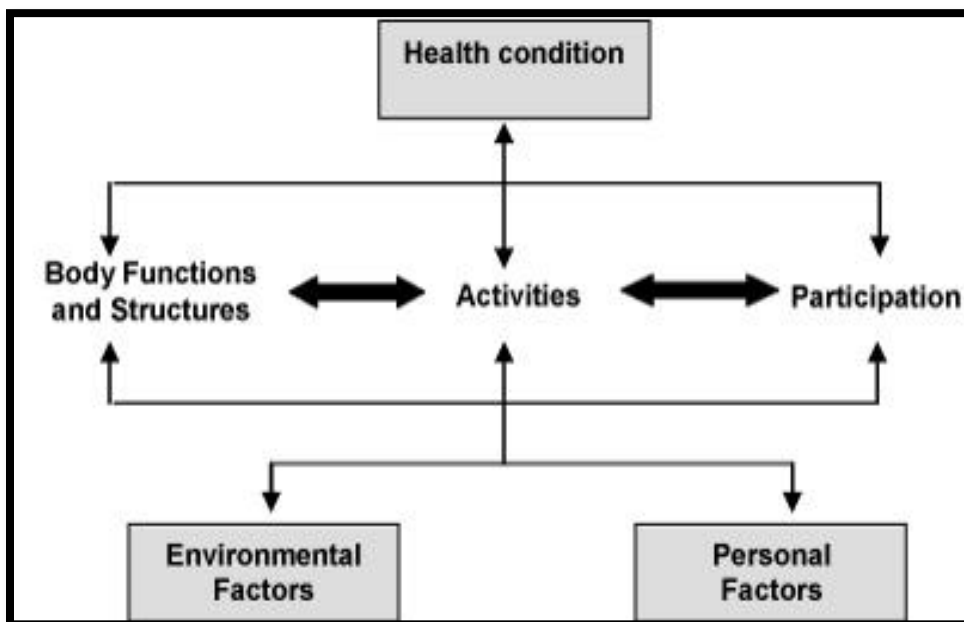


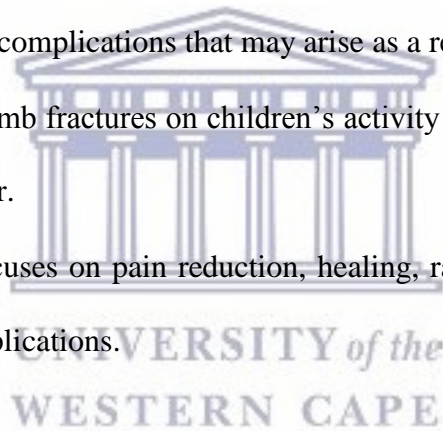
Figure 2.1: The World Health Organisation's (WHO) Model of Functioning

2.8 SUMMARY OF THE CHAPTER

This chapter reviewed the relevant literature pertaining to prevalence and incidence of upper limb fractures in children. Also reviewed were the risk factors, types of fractures and the mechanism of injury. The process of care both medical and physiotherapy management and the role of physiotherapist in the multi-disciplinary team was reviewed. Finally, the conceptual

model of functioning and disability used in this study was illustrated. The summary is highlighted below:-

- All over the world, trauma has been seen as the leading cause of morbidity, mortality and disability in childhood, with the most important component being fractures.
- Epidemiology of childhood fractures suggests that some fractures in children are related to sporting activities, many of which may involve vigorous physical activity.
- Fractures result in temporally activity limitations and sometimes can lead to permanent disabilities.
- There are a number of complications that may arise as a result of fractures.
- The impact of upper limb fractures on children's activity of daily living (ADL) depends on their age and gender.
- Physiotherapy also focuses on pain reduction, healing, rapid recovery of mobility, and avoidance of late complications.



CHAPTER THREE

METHODOLOGY

3 INTRODUCTION

This chapter provides an overview and rationale for the methodological framework used in this study. The researcher provides a brief description of the research setting in which the study took place. This is followed by a description of the study design and sampling methods used in the study. Furthermore, the chapter describes methods of data collection procedures and data analysis. In addition, the ethical considerations for the study are given.

3.1 RESEARCH SETTING

The research was conducted at Solwezi General Hospital, the largest hospital in the North-Western Province of Zambia. Zambia is a landlocked country covering an area of 752,612 square kilometres. It has a population of approximately 13.5 million (National Census, 2010). Solwezi is the provincial headquarters of the North Western part of Zambia. Solwezi General Hospital is a second level hospital and receives referrals from clinics from rural areas. It has one full-time employed orthopaedic surgeon as well as orthopaedic consultants from the University Teaching Hospital, one of the tertiary hospitals in Zambia that offer their services every second month. The hospital has seven (7) doctors and ten (10) physiotherapists working with the orthopaedic cases.

3.2 RESEARCH APPROACH

This study applied the triangulation research method in investigating the perceptions of health care professionals regarding the role of physiotherapy in the management of upper limb fractures

in children at Solwezi General Hospital, Zambia. A sequential explanatory mixed method was utilised. According to Creswell and Clark (2007), a sequential explanatory mixed method consists of two different independent phases, namely quantitative and qualitative. The qualitative data was first collected and analysed followed by the quantitative data collection and analysis. Qualitative results assisted to elaborate on the quantitative results and increased the understanding of the phenomenon under investigation.

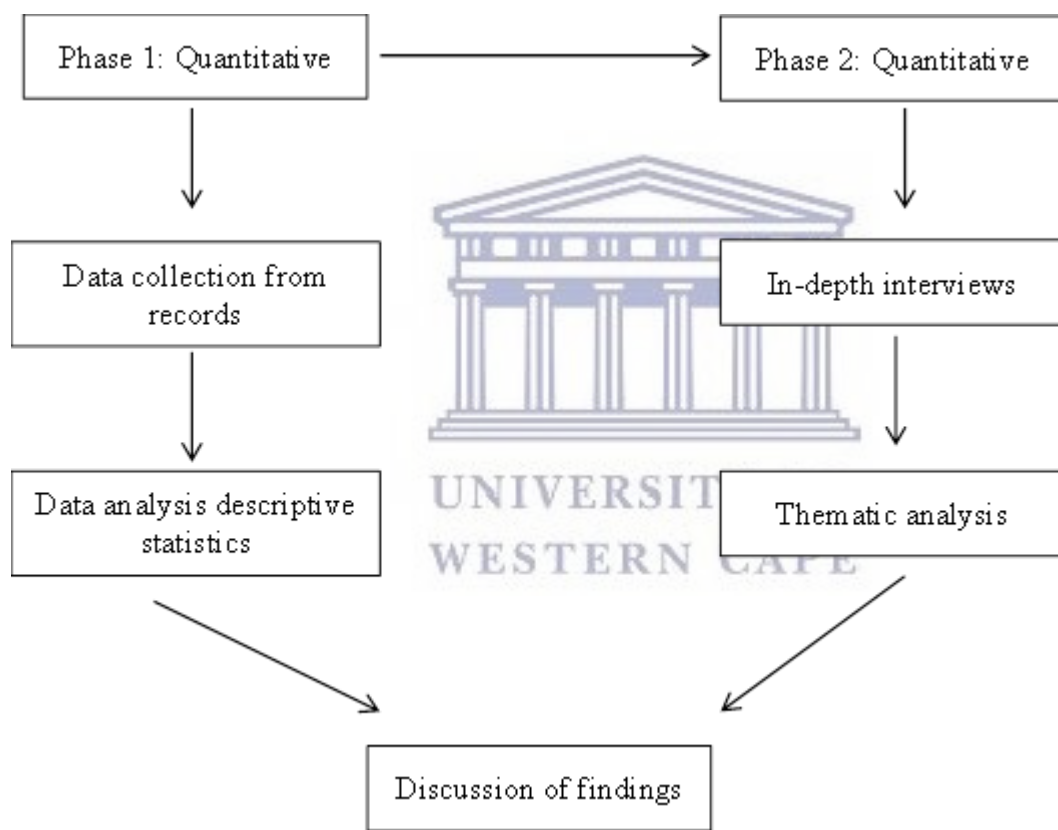


Figure 0.1: Visual model for the sequential explanatory mixed method design.

A **quantitative approach** was employed to address the first two objectives of the study, namely to describe the profile and the process of care (both medical and physiotherapy management) of the children admitted with upper limb fractures at Solwezi General Hospital, Zambia. According

to Daniels (2004), the quantitative approach involves drawing conclusions on procedures and controlled conditions that uses numeric methods. This approach gave the researcher an opportunity to use measurable deductive reasoning and logic to obtain data. Whereas quantitative methods worked best in isolating and identifying the correlates associated with the profile and the process of care of children with upper limb fractures, qualitative techniques were useful in gaining insight into the perceptions of doctors and physiotherapists regarding the role of physiotherapists in the management of upper limb fractures in children. The **qualitative approach** applied in this study therefore addressed the last two objectives of the study. The triangulations of the two approaches were evident in the discussion of the results, as presented in Chapter Six of the study.

3.3 STUDY DESIGN

A retrospective descriptive design was employed for the **quantitative part** of the study. A descriptive design makes mathematical data easy to understand (Drummond, 1996). This design was appropriate for the study because it links the present and the past occurrences (Polit and Beck, 2003). The existing medical records for the patients with upper limb fractures from 1 January 2012 to 31 December 2014 were assessed.

An exploratory design was used for the **qualitative part** of the study whereby in-depth interviews were carried out in order to understand the perceptions of medical doctors and physiotherapists regarding the role of physiotherapy in the management of upper limb fractures in children with an aim of preserving and representing their voices (Harmell and Carpenter, 2004).

3.4 STUDY POPULATION AND SAMPLING

3.4.1 Quantitative component

The study population included all upper limb fractures in children recorded in the hospital registers and patient files at Solwezi General Hospital for the period under review. The population included all cases of upper limb fractures for children aged between 0 and 14 years old recorded in the registers. Simple random sampling was used to arrive at a representative sample of children with upper limb fractures who were seen or admitted at Solwezi General Hospital, Zambia between 1 January 2012 and 31 December 2014. It is estimated that approximately 115 children are seen with upper limb fractures at Solwezi General Hospital per year (personal communication with a staff member working at the Records Department of Solwezi General Hospital).

Sample size estimation is as follows:

$$n = \frac{z^2 \times p(1-p)}{d^2}$$



- 50% proportion for unknown population
- Z = 95% CI
- 80% power
- d=0.05 precision
- Sample size = 385 (minimum)

Inclusion criteria

- Children aged 0 to 14 years old with fractures of the upper limb.

- Both male and female.
- Children treated at Solwezi General Hospital.
- Children whose files are from 1 January 2012 to 31 December 2014.

Exclusion criteria

- Children aged 0 to 14 years old who were referred to a different hospital for management.
- Children with both upper and lower limb fractures.
- Children with fractures due to other medical conditions.

In the present study the researcher employed the definition of a child according to Thandrayen et al. (2009) namely ranging between 0 and 14 years old.

3.4.2 Qualitative component

Purposive sampling, a non-probability sampling method was employed (Bernard, 2002). The population consisted of all ten (10) physiotherapists working in the Physiotherapy Department as well as the seven (7) doctors working in the Orthopaedic Wards of Solwezi General Hospital.

Exclusion criteria was the visiting medical doctors and interns; and physiotherapists with less than two years working experience and/ not employed full-time.

3.5 DATA COLLECTION INSTRUMENT

3.5.1 Quantitative component

A data extraction sheet was developed based on literature and research objectives in order to extract relevant information from the medical records. The sheet consisted of two sections.

Section A included socio-demographic information of the patient, mode of admission (direct or referral), circumstances of injury, type of fracture sustained, area of fracture, as well as possible complications. Section B included data on the process of care, e.g. medical (surgical or conservative) and physiotherapy treatment received. This section also included date of commencement, the number of sessions, modalities used and the treatment outcome.

Reliability and Validity

Validity refers to the idea that an instrument should measure what it is required to measure (Polit and Beck, 2003). A draft of the data extraction form was subjected to peer review by the study supervisor and colleagues who have experience working in an Orthopaedic Ward. This peer review was essential to check for content validity (Domholdt, 2000). **Reliability** according to Polit and Beck (2003, p35), is “the accuracy and consistency of information obtained from a study”. A pilot study with the aim of identifying potential problems and making corrections before the major study (Drummond, 1996) was done. A trained research assistant extracted data separately from the researcher from the same medical records. Variations on data collected were checked. Any discrepancy on data collected was resolved through discussion. The form was modified after pre-testing to better facilitate the process of data extraction. This ensured face validity and reliability of the data extraction form (Polit and Beck, 2003).

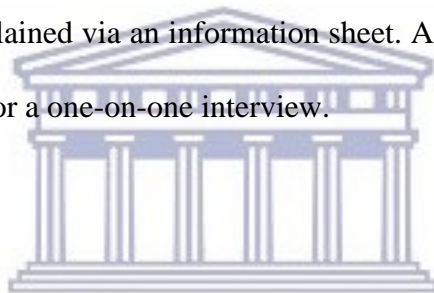
Pilot Study

The final data extraction form was pre-tested on 15 medical records for children with upper limb fractures patients in 2014. These records were not included in the main study since it was from a different year. The aim of the pilot study was to identify potential problems with an aim of

making corrections before the major study (Drummond, 1996). It also assists the researcher to ascertain whether the information needed is documented. The terminologies and order of information used in the instrument and that of the file were checked for uniformity.

3.5.2 Qualitative component

A semi-structured interview guide was developed and used during the individual interviews in English, the language all health care professionals in Zambia are familiar with. Approval was sought from all relevant authorities (see Ethics Statement). The medical doctors and physiotherapists were approached and invited to participate in the interview. The aim and objectives of the study was explained via an information sheet. A convenient time and place was organised for each participant for a one-on-one interview.



Trustworthiness

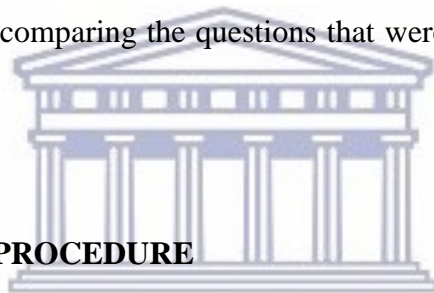
Trustworthiness refers to a series of techniques used to ensure rigor of qualitative designs (Guba, 1981). According to Polit and Beck (2003), trustworthiness of qualitative data is measured through credibility, transferability, dependability and confirmability. To ensure trustworthiness in the study, the following steps were taken.

Credibility: In order to establish confidence in the truth of the findings, the context of the narration was reviewed to ensure the participants addressed the asked questions, the richness of the narration were also compared with the main themes in terms of consistence and the explanation they support.

Transferability was assured by the researcher giving a detailed process of the qualitative data collection method, procedure and analysis to ensure repeatability of the study. It was also achieved by giving a description of the text, participant's characteristics and excerpts.

Dependability refers to the evidence that the process of data collection and analysis is consistence (Polit and Beck, 2004). To ensure dependability, the researcher used code-record procedure of analysing data and the themes generated independently.

Confirmability: Data was audited to ensure they reflected the participant's perspectives and experiences. This was done by comparing the questions that were asked with the answers given (Lincoln and Guba, 1985).



3.6 DATA COLLECTION PROCEDURE

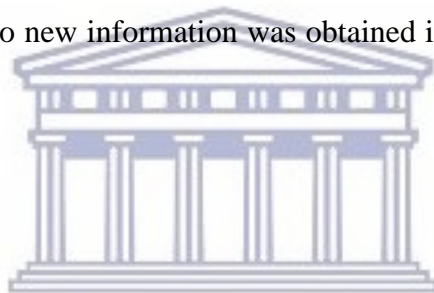
3.6.1 Quantitative component

Approval was sought from all relevant authorities (see Ethics Statement). The researcher and a trained research assistant identified patients (first name, surname, age, gender and addresses) of children who sustained upper limb fractures, both from the Orthopedic Clinic and the ward records. Patients that received physiotherapy management were identified in the Physiotherapy Records Book. Data was extracted from the files using the data extraction instrument.

3.6.2 Qualitative component

A semi-structured interview guide was developed and used during the individual interviews in English, the language all health care professionals in Zambia are familiar with. Approval was

sought from all relevant authorities (see Ethics Statement). The medical doctors and physiotherapists were approached and invited to participate in the interview. The aim and objectives of the study was explained via an information sheet. A convenient time and place was organised for each participant for a one-on-one interview. Written, informed consent was obtained from each participant before the interview began. The researcher explained that their participation was voluntary and that they had the right to withdraw from the study at any time. The interviews lasted approximately 30 - 45 minutes and a probing technique was used to ensure that no information was missed. The interviews were audio-taped and the research assistant took field notes for every interview. The interviews continued until saturation was reached; when information was repeated and no new information was obtained if the interview continued (Polit and Beck, 2003).



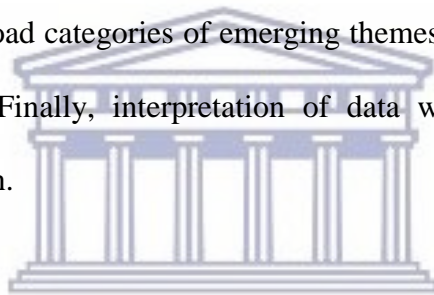
3.7 DATA ANALYSIS

3.7.1 Quantitative component

Analysis and description of all variables at baseline was done as they were presented in the data collection forms. In subsequent analyses, the unknowns for each of the study variables were left out. Age was collected as a continuous to avoid type 1 error, loss of power, residual confounding and bias. The Statistical Package for Social Science (SPSS) version 22.0 was used to analyse the quantitative data. Descriptive statistics was employed to summarise socio-demographic data such as age, gender, type of fracture, area of fracture and medical and physiotherapy management received. It is presented in graphs, tables and charts using frequencies and percentages. Inferential statistics (Chi-square tests and student t-tests) was employed to determine any association between variables. Significance was set at a p value < 0.05.

3.7.2 Qualitative component

The qualitative data was analysed by transcription verbatim of the audiotapes. Hammell and Carpenter (2004) stated that verbatim transcription of the data preserves the words of the participants. The transcription was done by an independent person with experience in transcription. The transcription was compared several times to audiotape recordings and field notes to ensure accuracy. Atlas.ti software was used for coding and thematic analysis. Thematic analysis was done on two levels; individual data and across all the participants, comparing themes and categories. Thematic analysis began whereby the transcriptions of all the interviews and process notes were read a number of times to familiarise the researcher with the content. The data was then be coded into broad categories of emerging themes. Identification, organising and naming of themes followed. Finally, interpretation of data was depended on the research objectives and research question.



3.8 ETHICS CONSIDERATIONS

The study involved retrieving hospital registers and patient files which may be considered as an invasion of the patient's privacy. Permission was sought from Solwezi General Hospital and the patients were only identified by serial numbers as recorded in the hospital registers. All the information was kept confidential. Minimal risks were expected in the study. In order to ensure distributive justice in the study, all the children with upper limb fracture during the study period were included in the sample; this was also used as a strategy to avoid any bias in the selection of the cases. It is also imperative to mention that there were no direct benefits for the participants. However, the study was beneficial in generating up to date information on management of upper limb fracture of children aged 0 and 14 years old, which is beneficial in informing policy

addressed at ensuring an effective and efficient management of upper limb fractures. Approval was sought from the University of the Western Cape's Senate Higher Degrees Committee. Further permission was sought from the Research and Ethics Department in Zambia and the Medical Superintendent of Solwezi General Hospital. For the quantitative part of the study, the aim and objectives of the study was explained and made available to all the participants in the form of an information sheet. Participation was voluntary and participants were given the opportunity to withdraw from the study at any time with no consequences. Informed written consent was obtained from all participants before participation in the study. Information obtained from the medical records and participants was for the study only and was handled with confidentiality. A code was given for each of the data extraction sheets; no other personal information that can identify the participant. The data collected was stored in a locker only accessible to the researcher. Pseudonyms were used to protect participants' identities when results are published. Tapes were destroyed after they had been transcribed and information documented according to themes. Minimal risks were expected in the study. Any sensitive issues or questions which arose from the study and could affect the participant was observed and carefully handled accordingly, or referred to an expert for appropriate attention. The results of the study were made available to all participants and the participating institution.

3.9 SUMMARY OF THE CHAPTER

In this chapter, the methodology used to conduct this study was presented. This included the study setting, study design, population and sampling, data gathering instrument and the ethical issues that were considered. The quantitative results that addressed objective one and two of the study will be presented in the next chapter.

CHAPTER FOUR

QUANTITATIVE RESULTS

4 INTRODUCTION

This chapter presents the findings of the statistical analysis that attempted to answer the first two objectives of this study, namely to establish the profile and describe the process of care of children with upper limb fractures admitted to Solwezi General Hospital, Zambia. The following will be outlined in the chapter: demographic profile and clinical characteristics of the participants, type (area/site) of the upper limb fractures, the development of post-fracture stiffness; mechanism of injury, medical management, physiotherapy management, physiotherapy treatment modalities and amount of physiotherapy treatment sessions. Age and gender differences are also addressed and outlined in the results. The findings are summarised in tables and illustrated by means of different figures.

4.1 DEMOGRAPHIC PROFILE AND CLINICAL CHARACTERISTICS OF THE STUDY SAMPLE (n=385)

A total of 385 children with upper limb fractures received treatment at Solwezi General Hospital during the study period (1 January 2012 - 31 December 2014). As illustrated in Table 4.1 below, the majority of the participants (n=255; 66.2%) was male. The mean age of children with upper limb fractures was 8.0 years old (SD=2.0). Almost two thirds (64.7%, n=249) of the participants were managed as outpatients (not admitted). A fall on an outstretched hand and from a height account for 37.4% (n=144) and 25.5% (n=98) of the mechanism of injury respectively. The majority of the participants (n=299; 77.7%) did not develop post-fracture stiffness.

Table 0.1: Demographic and clinical characteristics of the study sample (n=385)

CHARACTERISTICS	n (%)				
	Supracondylar 93 (24.2)	Radius/ulna 232 (60.3)	Humerus 41 (10.6)	Clavicle 19 (4.9)	Total 385(100)
Gender					
Male	57 (14.8)	166 (43.1)	23 (6.0)	9 (2.3)	255 (66.2)
Female	36 (9.4)	66 (17.1)	18 (4.7)	10 (2.6)	130 (33.8)
Age (mean = 8.0 yrs; SD=2)					
0 to 9 years	86 (22.3)	145 (37.7)	28 (7.3)	19 (5.0)	278 (72.2)
10 to 14 years	3 (0.8)	87 (22.6)	13 (3.4)	4 (1.0)	107 (27.8)
Residence					
Urban	48 (12.5)	119 (31)	21 (5.5)	5 (1.3)	193 (50.1)
Peri-urban	45 (11.7)	113 (29.4)	20 (5.2)	14 (3.6)	192 (49.9)
All fracture hospital cases					
Outpatient	49 (12.7)	165 (42.9)	19 (4.9)	16 (4.2)	249 (64.7)
Inpatient (admitted)	44 (11.4)	67 (17.4)	22 (5.7)	3 (0.8)	136 (35.3)
Injury Mechanism					
Outstretched hand	8 (2.1)	126 (32.7)	2 (0.5)	8 (2.1)	144 (37.4)
Direct blow	23 (6.0)	27 (7.0)	14 (3.6)	7 (1.8)	71 (18.4)
RTA	32 (8.3)	24 (6.2)	13 (3.4)	0 (0.0)	69 (18)
Osteoporosis	0 (0.0)	1(0.3)	2 (0.5)	0 (0.0)	3 (0.8)
Fall from height	30 (7.8)	54 (14.0)	10 (2.6)	4 (1.0)	98 (25.5)
Post-fracture stiffness					
Yes	50 (13.0)	19 (4.9)	17 (4.4)	0 (0.0)	86 (22.3)
No	43 (11.1)	213 (55.3)	24 (6.2)	19 (4.9)	299 (77.7)
Physiotherapy management after post-fracture stiffness					
Yes	46 (53.5)	16 (18.6)	15(17.4)	0 (0.0)	77 (89.5)
No	4 (4.7)	3 (3.5)	2 (2.3)	0 (0.0)	9 (10.5)

4.2 TYPE (AREA/SITE) OF UPPER LIMB FRACTURES (n=385)

The majority of the participant (60.3%; n=232) had a fracture of the radius/ulna, while 24.2% (n=93) had a supracondylar fracture. Humerus and a clavicle fractures accounted for 10.6% (n=41) and 4.9% (n=19) respectively, as demonstrated in Figure 4.1.below.

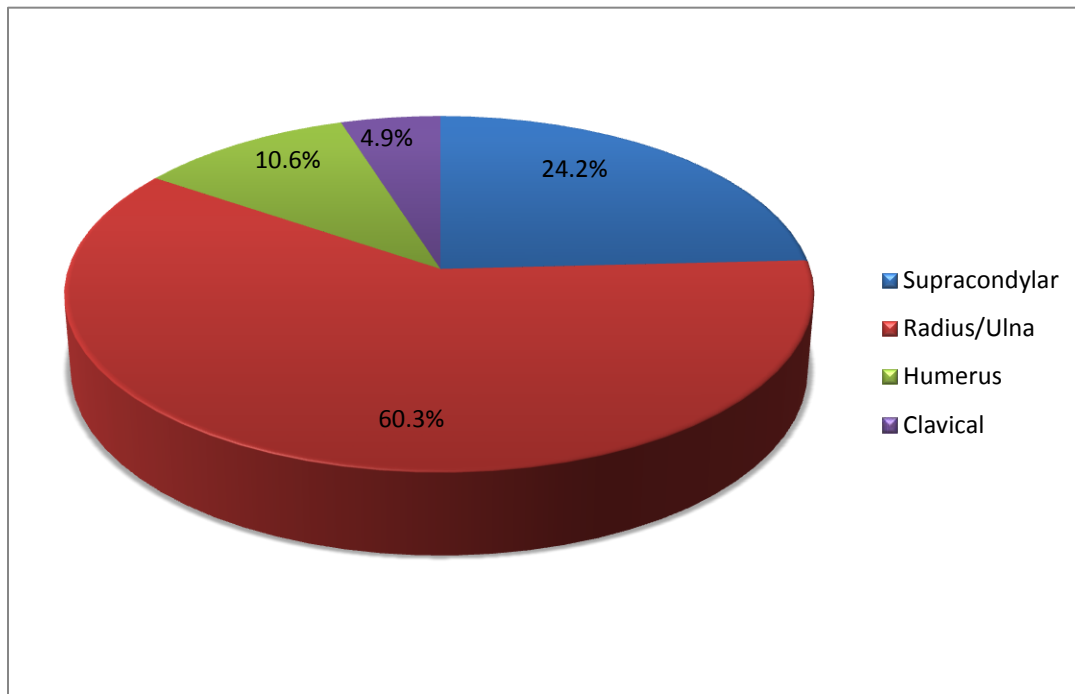


Figure 0.1: Type (area/site) of upper limb fractures (n=385)

4.3 GENDER AND FRACTURE TYPE (AREA/SITE)

Male dominance was observed during data collection. Overall males accounted for 66.2% (n=255) of the cases whereas females accounted for 33.8% (n=130). Similarly, male dominance was observed in all types of fractures, except for fractures of the clavicle. The following were the percentage gender distribution for different type of fractures (male vs female): supracondylar fracture (14.8 vs 9.4) radius/ulna fracture had the highest prevalence for both male and female (43.1 vs 17.1), humerus fractures (6.0 vs 4.8). The least representation for gender was for

clavicular fractures with more females than males affected, 2.6% and 2.4% respectively, as illustrated in Figure 4.2 below.

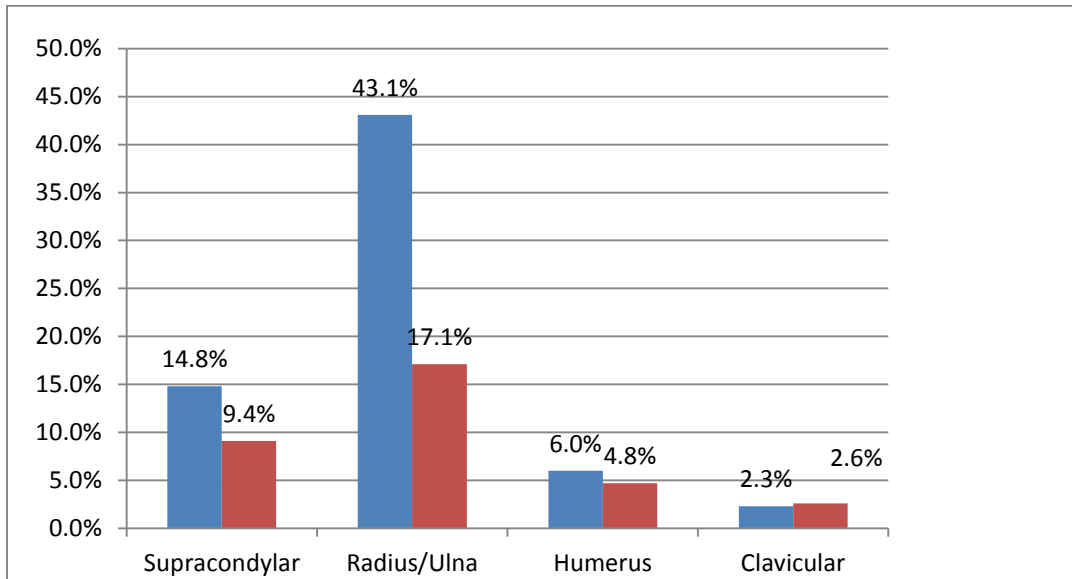


Figure 0.2: Type (area/site) of fractures and gender

Chi-square test was performed to test whether there was a statistically significant difference in the types of fracture for male and female participants. Significantly, more male than female participants had a fracture of the radius/ulna ($p=0.002$), proximal third of the humerus ($p=0.042$) and supracondylar fractures ($p=0.032$). No statistical significant difference was found for gender and head and neck of humerus fractures, with p -values of 0.78 and 0.65 respectively. See Table 4.2 below.

Table 0.2: Fracture site/type and gender (n=385)

Fracture site	frequency (n)	percentage (%)	p-value
Proximal 1/3 of humerus	23	6.0	0.042*
<i>Male</i>	19		
<i>Female</i>	4		
Head of humerus	77	20.0	0.780
<i>Male</i>	52		
<i>Female</i>	25		
Neck of humerus	101	26.2	0.650
<i>Male</i>	99		
<i>Female</i>	2		
Supracondylar fracture	93	24.2	0.032*
<i>Male</i>	73		
<i>Female</i>	20		
Radius/Ulna fracture	42	10.9	0.021*
<i>Male</i>	34		
<i>Female</i>	8		
Clavicle fracture	49	12.7	0.231
<i>Male</i>	26		
<i>Female</i>	23		

*significant p-value

4.4 AGE AND FRACTURE TYPE (AREA/SITE)

As shown in the Figure 4.3 below, the radius/ulna was the most common fracture followed by the supracondylar fracture. The age group 0-9 years old accounted for 37.7% (n=145) while 10-14 years accounted for 22.6% (n=87). Supracondylar fracture was more in the age group 0-9 years old (n=86, 22.3%) with a mere 3% (n=0.8) in the age group 10-14 years old. The mean age for sustaining a fracture of the radius/ulna was higher (8.0 years old, SD = 2.0) than that of participants that sustained a supracondylar fracture (7.0 years old, SD=2.0). The lowest median

age of 5 years old was reported for a clavicular fracture 4.9% (n=19). Significantly more children in the younger age group (0 – 9 years old) sustained a fracture ($p < 0.01$).

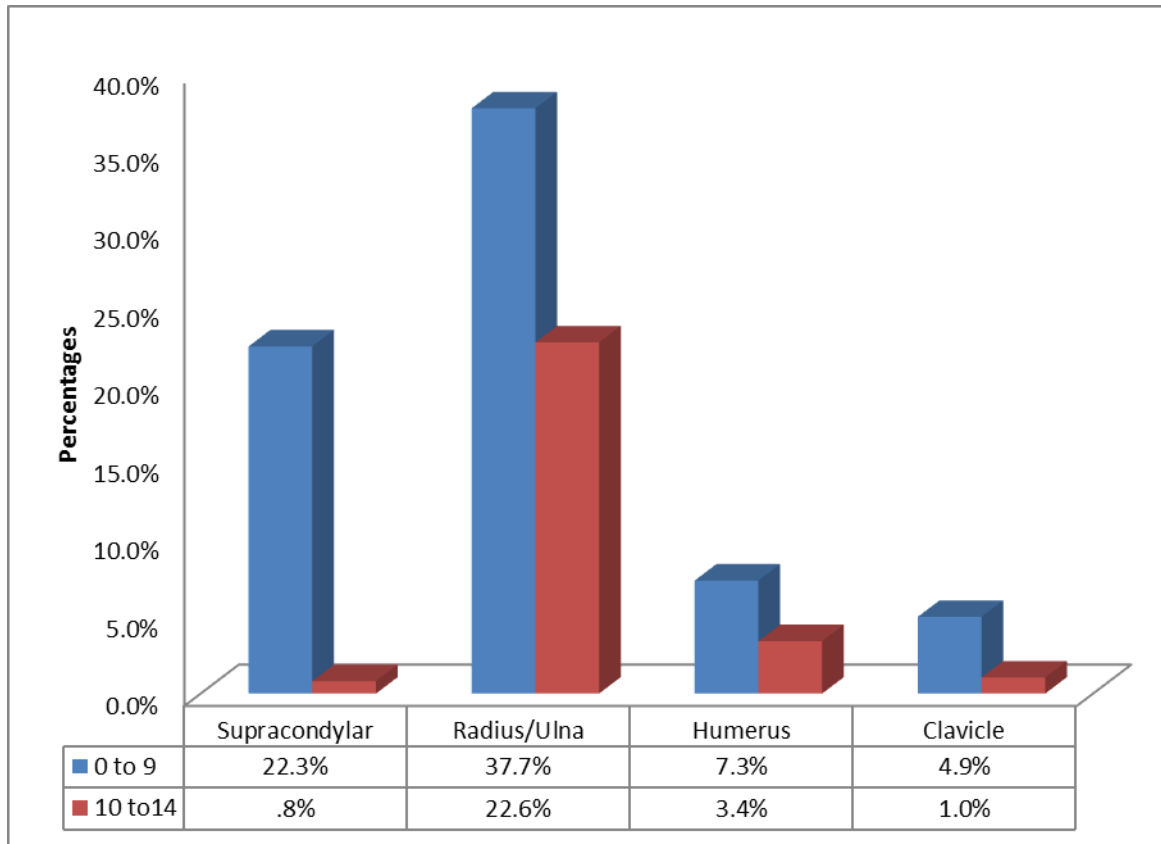


Figure 0.3: Type (area/site) of fractures and age.

4.5 POST-FRACTURE STIFFNESS

As illustrated in the Figure 4.4 below, the majority of the participants (77.7%; n=299) did not develop post-fracture stiffness in the joints of the upper limb, while less than a quarter of the participants (22.3%; n=86) developed stiffness. Of the 86 (22.3%) participants that developed post-fracture stiffness, more than half (58.1%, n=50) had a supracondylar fracture. Significantly more children with a supracondylar fracture developed post-fracture stiffness ($p = 0.000$).

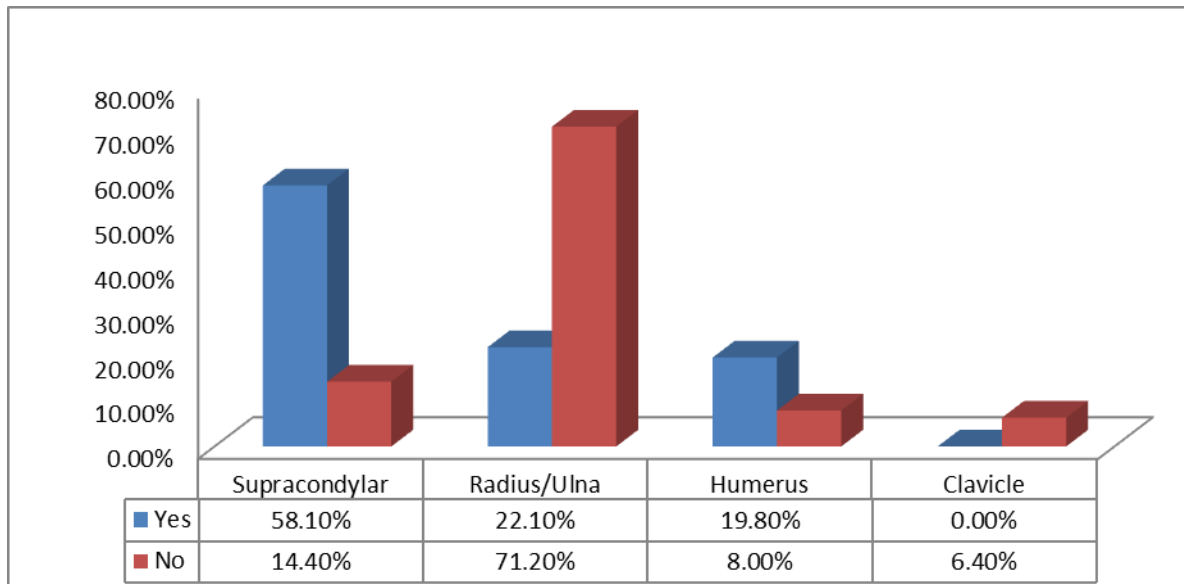


Figure 0.4: The development of post-fracture stiffness.

4.6 GENDER AND POST-FRACTURE STIFFNESS

Gender difference was also noted for the development of post-fracture stiffness. Of the 86 participants that developed post-fracture stiffness, 62.8% (n=54) were male and 37.2% (n=32) were female. Significantly, more male than females participants developed post-fracture stiffness ($p < 0.001$).

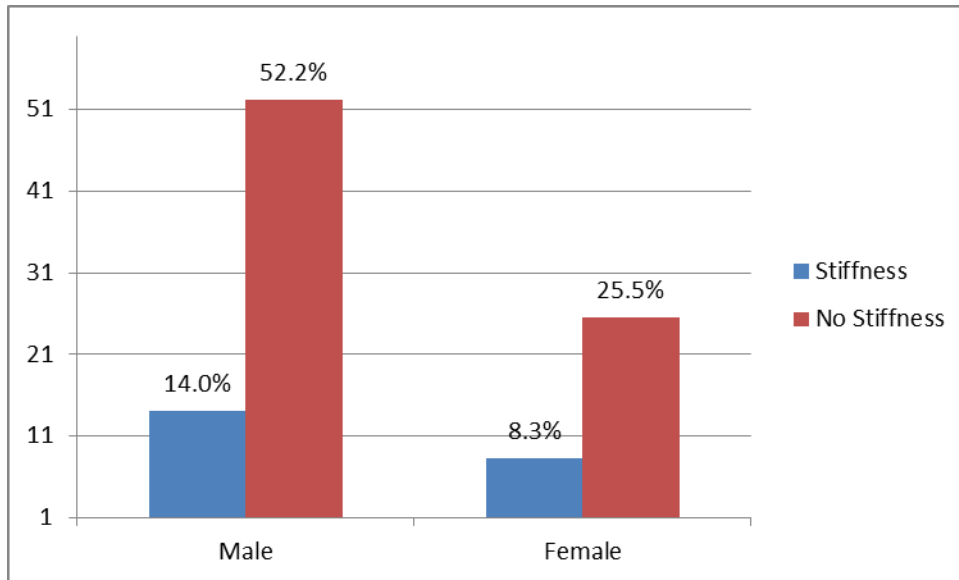


Figure 0.5: Post-fracture stiffness and gender (n=86).

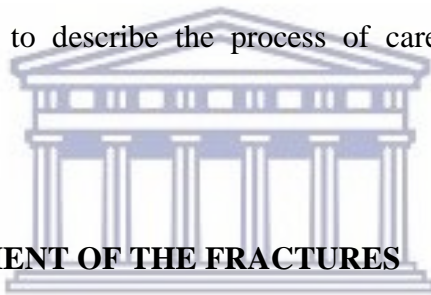
4.7 MECHANISM OF INJURY

The mechanism of injury for each fracture type is presented in the Table 4.3 below. Almost ten percent (8.3%; n=32) of supracondylar fractures were caused by road traffic accidents (RTAs), followed by a fall from the height (7.8%; n=30), a direct blow to the arm (6.0% n=23) and a fall on an outstretched hand (2.1%; n=8). Less than a third (32.7%; n=126) of fractures of the radius/ulna were caused by a fall on an outstretched hand, followed by a fall from a height (14.0%; n=54), while a direct blow and RTAs caused 7% (n=27) and 6.2% (n=24) respectively. For the humerus fractures, a direct blow to the area (3.6%; n=14) and RTAs (3.4%; n=13) lead to the injury while a fall on an outstretched hand (2.1%; n=8) and a % direct blow to the area (1.8%; n=7) caused clavicular fractures. A fall on outstretched hand was the highest mechanism with 37.4% (n=144). Significantly more radius/ulna fractures were caused by a fall on an outstretched hand (p=0.000).

Table 0.2: Mechanism of injury and site/type of fracture (n=385)

Mechanism of injury	Site/Type of fracture n (%)			
	Supracondylar	Radius/Ulna	Humerus	Clavicular
Fall on an outstretched hand	8 (2.1)	126 (32.7)	2 (0.5)	8 (2.1)
Direct blow	23 (6.0)	27 (7.0)	14 (3.6)	7 (1.8)
Road traffic accident (RTA)	32 (8.3)	24 (6.2)	13 (3.4)	0(0)
Osteoporosis disease	0 (0)	1 (0.3)	2 (0.5)	0(0)
Fall from a height	30 (8.0)	54 (14.0)	10(2.6)	4(1.0)

The second objective, namely to describe the process of care of patients with upper limb fractures, is presented below.



4.8 MEDICAL MANAGEMENT OF THE FRACTURES

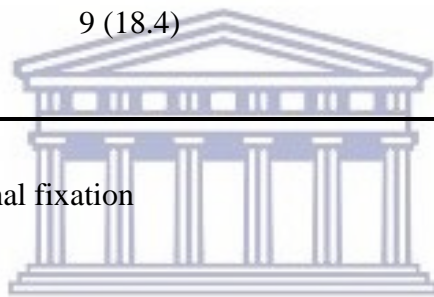
The medical management for each type of fracture is shown in Table 4.4 below. The majority of fractures (83.4%; n=321) were managed surgically. Almost a quarter (24.7%; n=23) of supracondylar fractures were managed conservatively (either POP and/or arm sling) while those managed by surgical management (ORIF) were 75.3% (n=70). More than half (52.4%; n=22) of radius/ulna fractures were managed conservatively while 47.6% (n=20) were managed surgically. Surgery was also the choice of medical management for the majority of clavicle fractures (81.6%; n=40).

Table 0.3: Medical management of fractures (n=385)

Fracture type	Conservative management (POP and/or arm sling)*	Surgical management (ORIF) **
	n(%)	n(%)
Supracondylar	23 (24.7)	70 (75.3)
Radius/Ulna	22 (52.4)	20 (47.6)
All humerus type	10 (5)	191(95)
Clavicle	9 (18.4)	40 (81.6)

* POP = Plaster of Paris

**ORIF = open reduction internal fixation



4.9 PHYSIOTHERAPY MANAGEMENT (n=77)

This section presents the number of patients admitted with upper limb fractures who received physiotherapy management (see Figure 4.6 below). Of the 86 participants (22.3%) that developed post-fracture stiffness, more than three quarters (89.5%; n=77) received physiotherapy. Supracondylar fractures accounted for 53.5% (n=46), followed by radius/ulna fractures at 18.6% (n=16) and humerus fractures with 17.4% (n=15). None of the children with clavicle fractures received physiotherapy. Although more children with a supracondylar fracture received physiotherapy, no significant association were found for post-fracture stiffness and whether the child received physiotherapy management or not (p=0.321).

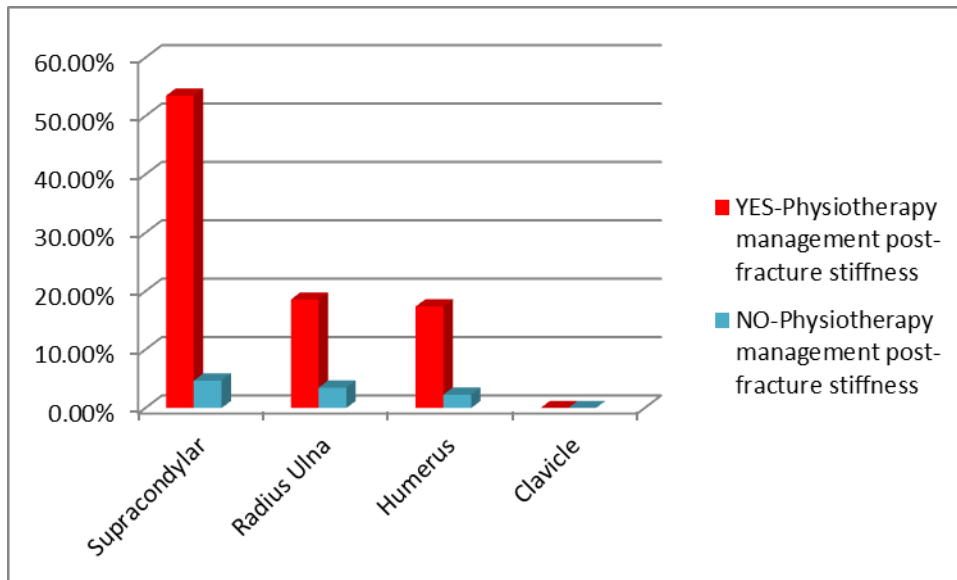


Figure 0.6: Physiotherapy management per type of fracture.

4.10 PHYSIOTHERAPY TREATMENT MODALITY (n=77)

Figure 4.7 below presents the physiotherapy interventions used to treat patients with upper limb fractures. Of the 77 participants that received physiotherapy management, the majority (87.0%; n=67) received exercise therapy, while only 9.1% (n=7) received electrotherapy treatment. Manual therapy was only administered to 3.9% (n=3) of the children that received physiotherapy treatment.

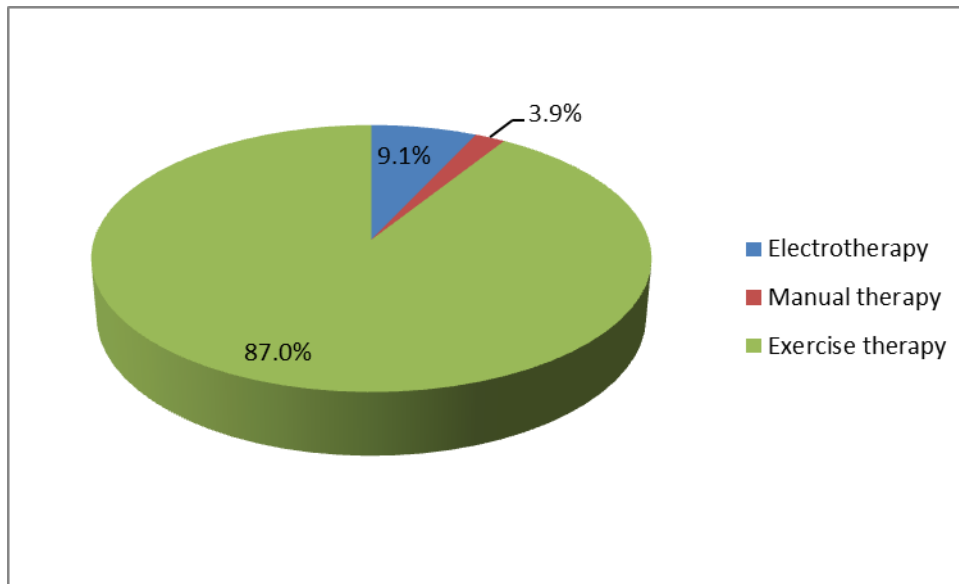


Figure 0.7: Physiotherapy treatment modalities employed used after admission

4.11 GENDER AND TREATMENT MODALITY RECEIVED

Independent sample t-test was performed to test whether there was a statistically significant difference in gender and the treatment modalities used, as shown in Table 4.5 below. A significant difference was found for gender and exercise therapy ($p=0.03$) as more male participants received exercise therapy. No statistical significant difference was found for manual therapy ($p=0.70$) or electrotherapy ($p=0.859$).

Table 0.4: Physiotherapy Management among male and female participants (n=77)

Type of modality	Frequency (n)	p-value
Electrotherapy		
Male	3	0.859
Female	4	
Manual Therapy		
Male	1	0.70
Female	2	
Exercise Therapy		
Male	59	0.003*
Female	8	

*statistical significant

4.12 PHYSIOTHERAPY TREATMENT SESSIONS AFTER REFERRAL BY A MEDICAL DOCTOR/ CLINICAL OFFICER

The majority of the participants (75.3%; n=58) received 31 to 40 physiotherapy treatment sessions, followed by 14.3% (n=11) attending 21 to 30 sessions and 7.8 % (n=6) attending between 41 and 50 sessions. See the Table 4.6 below.

Table 0.5: Physiotherapy treatment sessions (n=77)

Physiotherapy treatment sessions	Frequency (n)	Percent (%)
< 20	2	2.6
21 - 30	11	14.3
31 - 40	58	75.3
41 - 50	6	7.8

4.13 SUMMARY OF THE CHAPTER

The current study aimed to describe the profile of children with upper limb fractures seeking surgical and physiotherapy care at Solwezi General Hospital over a period of three years. The following results were obtained from the analysis of the quantitative data of the children with upper limb fractures:

- The majority of the participants (n=255; 66.2%) was male.
- The mean age of the children with upper limb fractures was 8.0 years old (SD=2.0).
- Almost two thirds (64.7%, n=249) of the participants were not admitted to the hospital (treated as an outpatient).
- The majority (60.3%; n=232) of the participant's had a fracture of the radius/ulna.
- Significantly more male participant had a fracture of the radius/ulna (p=0.002), proximal third of the humerus (p=0.042) and supracondylar fractures (p=0.032).
- Significantly more children in the younger age group (0 – 9 years) sustained a fracture (p=0.01).
- A fall on an outstretched hand and from a height account for 37.4% (n=144) and 25.5% (n=98) of the fractures respectively.
- Significantly more radius/ulna fractures were caused by a fall on an outstretched hand (p=0.000).
- The majority of the participants (n=299; 77.7%) did not develop post-fracture stiffness.
- Significantly more male than females participants developed post-fracture stiffness (p<0.001).
- Significantly more children with a supracondylar fracture developed post-fracture stiffness (p=0.000).

- The majority of fractures (83.4%; n=321) were managed surgically.
- Of the 86 participants (22.3%) that developed post-fracture stiffness, more than three quarters (89.5%; n=77) received physiotherapy.
- The majority of the participants (75.3%; n=58) received 31 to 40 physiotherapy treatment sessions.
- Significantly more male participants received exercise therapy (p=0.03).

The following chapter will present the results of the qualitative data collected through interviews with medical doctors and physiotherapists that attempt to answer objective three and four of the study.



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CHAPTER FIVE

QUALITATIVE RESULTS

5 Introduction

This chapter presents the results of the content analysis of the semi-structured interviews which attempted to answer objective three and four of the study namely, to explore the perceptions of doctors and physiotherapists regarding the role of physiotherapy in the management of upper limb fractures in children at Solwezi General Hospital, Zambia. The description of the participants is followed by the presentation of the emerging themes, derived from the thematic analysis. In the presentation of the findings, verbatim quotations were used to illustrate the themes and sub-themes. To ensure anonymity and confidentiality of the participants, cryptogram **D1 to D4** and **P1 to P5** were employed to present data for doctors and physiotherapists respectively. The quotations are in italics and three ellipsis points (...) were used to indicate unnecessary material that was omitted.

5.1 DESCRIPTION OF MEDICAL DOCTORS (n=4)

The researcher purposively included four (4) doctors working in orthopaedic wards at Solwezi General Hospital and responsible for referrals of patients for physiotherapy. All four doctors agreed to participate of whom 75% (n=3) were male and 25% (n=1) were female. The age of the participants ranged between 28 and 42 years old (mean age=36.63 years old; SD=7.17). Their work experience ranged between 4 and 20 years (mean=10 years; SD=4.79).

5.2 EMERGING THEMES

The following themes emerged from the analysis of the data collected during the interviews with the medical doctors:

- Awareness of medical doctors regarding the role of physiotherapy in management of upper limb fractures
- Perceptions of medical doctors regarding the capabilities of the physiotherapists
- The role of team work between the doctors and physiotherapists
- Suggested improvements

These themes are outlined and illustrated by means of verbatim quotes.

5.2.1 Awareness of medical doctors regarding the role of physiotherapy in the management of upper limb fractures

In order to be aware of the skills and capabilities of another profession within the medical field, it calls for collaborative and spirited teamwork of all necessary players. Otherwise management of a particular case may not yield the expected results, no matter the effort. The role of physiotherapy in the management of upper limb fractures in children requires some experience on that part of the medical doctors. A better awareness of may help foster team work and consequently contribute to better recovery of children presenting with upper limb fractures. In the present study, the perceptions of medical doctors regarding the role of physiotherapy varied, as illustrated below.

“...very important profession because it plays a big role in diagnostic treatment and in rehabilitation of the patients with different conditions not only fractures, injuries but also stroke” ... (D4)

“Physiotherapists are healthcare professionals concerned with the assessment, treatment and also prevention of dysfunction and injuries in people of all ages...” (D2)

Other participants thought of physiotherapists as experts that need to be consulted. They are more specialised and experienced in the field of fracture management. The participants seemed aware of the role of the physiotherapist following upper limb fractures in children, as they illustrated that physiotherapists have an important role to play in the management of upper limb fractures.

“...a discipline that helps in the recovery of patients in the function of the limbs if they are affected by injury. Physiotherapists are more specialised in that area when it comes to management and they know how to give proper advice.” ... (D1)

“In cases of fractures, I involve physiotherapists because I know they are more experienced when it comes to fracture management and also in P.O.P (Plaster of Paris) application.” ... (D3)

“...those fractures have to be managed together, physiotherapists and the doctors and to come up with a treatment plan. It is not just a matter of applying the plaster but it also needs a re-assessment...” (D2)

“...after the plaster has been removed, physiotherapy should put up a plan on when the child should commence the sessions, what type of exercises to be done at home or if the child requires to come to the centre...”(D3)

Another participant narrated that when he sees a child with an upper limb fracture, he always involves the physiotherapist, because he knows their role of rehabilitating and re-educating the patient in functional activities.

“When you see the patient like that you have to involve the physiotherapist to come and deal with the bones because the patient has lost function and they have not been using the limb...” (D4)

5.2.2 Perceptions of medical doctors regarding the capabilities of the physiotherapists

As part of a multi-disciplinary team, it is vital to acquaint oneself with the capabilities of others. This may assist with appropriate referral of children with upper limb fractures. The perception of the capabilities of the physiotherapist profession among medical doctors varied considerably, as illustrated by the excerpts below.

“Yeah I can say that I am very glad that we have such a Physiotherapy Department like we have... and the cooperation. I enjoy working with these people (physiotherapists) because they are very cooperative and they really have very good outcomes and I am very positive in continuing working together...” (D3)

“...ever since I’ve started to involve the Physiotherapy Department, the outcome has been very good and the cases that we used to refer now we are getting very positive results...” (D4)

Although the participants acknowledged and appreciated physiotherapy services, shortcomings were also identified. Lack of follow up was a major concern, as demonstrated in the verbatim quotes below.

“When I started working in the surgical ward, physiotherapists were very effective and consistent but nowadays, you find that in a week, they only attend to a patient maybe twice...” (D3)

One participant was concerned about the absence of the physiotherapist during ward rounds, despite his request for attendance.

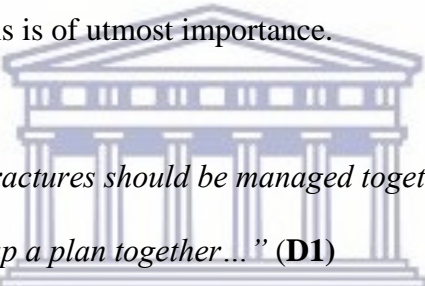
“Another thing is as much as we request the involvement of physiotherapy; they rarely show up for ward rounds. I don’t know if they have a shortage of staff in their department...” (D1)

Lack of communication between physiotherapists and doctors could also play an important role in not so positive outcomes for the patients. The excerpt below illustrates:

“There is no communication between physiotherapists and doctors because doctors just apply the plaster and sends the patient home instead of referring the patient to physiotherapy for a review. Sometimes we also send the patient late for physiotherapy when the limb is already fixed. So they cannot do anything about it.” (D4)

5.2.3 The role of team work between physiotherapist and doctors

Efficient practice on part of the medical doctor as well as the physiotherapist is needed in the management of upper limb fractures among children. Theoretical knowledge pertaining to the management of upper limb fractures alone is not enough. Clear and frequent communication between therapists and physicians is of utmost importance.



“What I can say is that fractures should be managed together by physiotherapists and the doctors. At least we put up a plan together...” (D1)

“Yes I can say we do manage fractures well. But I think we also need to reinforce the cooperation between physiotherapists and the doctor...” (D2)

“When it comes to the planning process, we are supposed to meet as a multi-disciplinary team we sit together and plan the management of these patients. But the way it is, we rarely meet the physiotherapists and yet they know their role they play with patients in the ward, we see the patients but we don't meet with them. What i can say is that there is no interaction...” (D3)

5.2.4 Suggested improvements

i. Improved co-operation

One participant would like to work more closely with the physiotherapist, as he feels that working together will have better outcomes for the patients.

“I think in order to reinforce the co-operation between physiotherapists and the doctor in the wards, a physiotherapist should be allocated to each ward while the doctor is doing a ward round, we can do the assessment of the patient together...”(D1)

With the issue of the introduction of mobile hospitals in the district, it is seen that physiotherapy is the only department that was left out since they thought the services were not necessary. The participants suggested that physiotherapy should be involved in order to have a good service delivery as this could also prevent the development of complications.

“In rural areas, most people are ignorant about physiotherapy. Therefore there is need for or sensitisation of the services offered.”(D2)

Another participant mentioned the need for better teamwork.

“There are a high number of children with complications due to fractures and little is known about physiotherapy. Therefore there is need for the involvement of physiotherapy in the management team.”(D1)

ii. Motivation for education

The Ministry of Health has come up with measures of educating doctors on the new methods of fracture management. The participant also made a suggestion to the hospital management to also motivate physiotherapists in terms of attending workshops.

“We should motivate them (physiotherapists) by including them in the financial allocations so that they can do some follow up on the children.”(D4)

“....the issue of including them in workshops together with us doctors so that we can learn on the new methods of treatment since physiotherapy is a very important profession and also that we can work together to have a greater achievement or a common goal.”(D2)

5.3 DESCRIPTION OF PHYSIOTHERAPISTS (n=5)

The researcher purposively included five (5) physiotherapists. The majority of the participants (80%, n=4) were female and one participant (20%) were male. The age of the participants ranged between 26 and 52 years old (mean age = 31.2 years old; SD=4.3). Physiotherapy experience ranged between 2 and 20 years (mean = 9 years; SD=3.4).

The interviews were conducted with regard to the following pre-determined themes.

- The role of physiotherapy in the management of upper limb fractures in children
- Consultation with the doctor
- Process of care
- Challenges experienced

- Suggested improvements

These five themes are delineated and illustrated by means of verbatim quotes.

5.3.1 The role of physiotherapy in the management of upper limb fractures in children

Physiotherapist should understand the role they play in the management of upper limb fractures in children in order to makes appropriate suggestions with regards to treatment plans and management of patients. The researcher therefore in this case tried to establish the role of physiotherapists in management of upper limb fractures in children. The responses were very overwhelming from the participants and they gave varying responses on their role as shown below.

“...the role that we play in the management of upper limb fractures mainly is to stabilise...” (P1)

“...physiotherapy mobilises the joint in order to keep the range of motion which is available to avoid further stiffness...” (P2)

“In cases of muscle atrophy, we encourage strengthening exercises to gain the muscle power and to avoid neural related cases like numbness...” (P5)

To assist the patient to function at the pre-fracture level is very important, as illustrated in the excerpt below.

“Our aim is to make sure the patient is able to function as near normal as possible...”

(P3)

“In management of fractures, the physiotherapists aim to help the patient to maximise their possible abilities of achieving function and independence for activities of daily living...” (P4)

5.3.2 Consultation with the Doctor

It is very important that the physiotherapist learn to consult the doctor in the management of upper limb fracture. Usually communication is via the patient files and sometimes via a telephone conversation. Despite all these avenues it was evident that very few physiotherapists made use of the opportunities to consult the doctor.

“We communicate via nurses from the same wards or through the notes. The use of the telephone is no longer in operational so sometimes you find that there is only one nurse doing the shift so it becomes very difficult for them also to leave the patients alone to come and call us.” (P3)

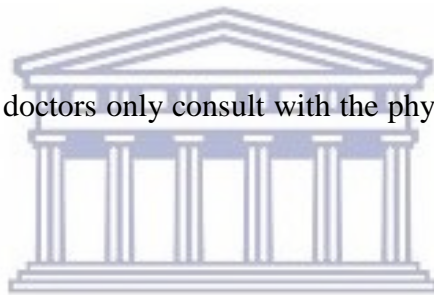
“I usually think we not really included in the first process though sometimes they would write in file that the child needs physiotherapy but no request reaches us...” (P5)

“We are flexible regardless of the type of consultation received. Whether it is phone or the doctor just informs you within the hospital premise that there is patient, we just respond to the request.” (P1)

One participant mentioned that the physiotherapists not always respond to the doctor’s request to see a patient.

“Sometimes you find that we do not make a follow up on our patients even if doctors request for our services.”(P4)

One participant felt that certain doctors only consult with the physiotherapist when they feel like it, not always when needed.



“There are certain doctors who consults physiotherapy before procedures like manipulations under anaesthesia (MUA) is done but others only decide to engage us when a complication arises.”(P2)

One participant disputed the issue of doctors prescribing a treatment plan for physiotherapists. The excerpt below demonstrates:

“...from my own understanding, a doctor should only refer a patient for physiotherapy. But doctors instruct us on the type of exercises or treatment modalities to use on patients.”(P2)

5.3.3 Process of care

Encouraging individual optimal function and a normal or near normal level of independence is the main aim in the process of care for someone with a fracture. Physiotherapy should also be commenced early enough to prevent the development of complications. See excerpts below.

“Our main aim is just to rehabilitate to normal or to near normal if at all we are unable to reach the normal stage. Physiotherapy should start just there and then when the child has a fracture...” (P2)

“When there is an issue of muscle atrophy, we encourage mobilizing and strengthening exercises and beyond that we also do massage and ultra sound in cases of contractures.”(P4)

“When we fail to achieve the normal range of motion, we encourage ADLs (activities of daily living), as long as the limb is in a functional position.”(P5)

“When it’s time to remove the plaster, we do a check x-ray and when we are satisfied that there is callus and no pain we can remove the cast and then give advice.”(P1)

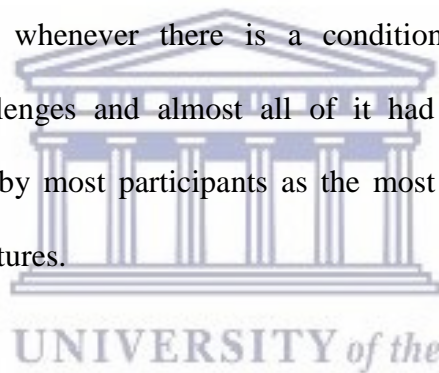
Some of the participants were in favour of surgical management to prevent prolonged immobilisation that could lead to complications.

“Children could benefit from o operative treatment coz (sic) it minimises the time that the child is in a fixed position and I think it calls for early mobilisation compared to what we have been doing...” (P5)

“Joints need motion to keep their function... may temporarily lose its function and since the operative treatment to recover full range of motion is required, an ideal post-operative programme is essential to achieve the best possible healing result...” (P3)

5.3.4 Challenges experienced

There are always challenges whenever there is a condition to be treated or managed. Physiotherapists narrated challenges and almost all of it had to do with complications of fractures. Stiffness was noted by most participants as the most challenging experience in the management of upper limb fractures.



“...most common challenge is the post mobilisation stiffness even when you immobilise the fracture to the point where it’s healed you will end up with stiffness.” (P5)

“We have challenges mostly in the supracondylar fracture; unlike the ulna and radius...” (P2)

The role of family members in the management of the child as well as their contribution to the development of complications was also a concern for the physiotherapists.

“The challenge that we face here at Solwezi General Hospital is maybe the child had a fracture and the parents keeps the child three weeks or maybe a month at home. So by the time they come, the elbow is stiff. So you have to go back again to start mobilising...”

(P1)

*“You find that parents stop bringing the children for exercises after maybe two weeks if they don’t see any change...”***(P5)**

One participant mentioned that lack of time due to a high patient load also hampers proper treatment.

*“We attend to so many children with fractures in the department; plus time is not enough. So you find that less attention is given to each child. I think treatment is not effective.”***(P4)**



Lack of appropriate equipment needed for rehabilitation is also a problem.

*“We don’t have enough gadgets so beyond that, we only use improvised pulleys and this makes the exercises boring for children. You find that if the therapist fails to motivate the child, the treatment is useless.”***(P5)**

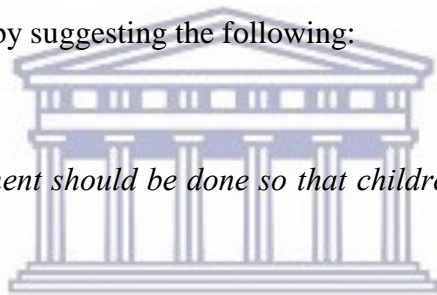
5.3.5 Suggested improvements

They were suggestions from participants that would help address the main challenges and management of upper limb fractures. Participants mentioned improvement in assessment and examination as narrated below.

“Ok I think the area of clinical assessment and examination needs a lot of improvement because it’s the first stage in the attempt to manage these fractures and I think if done inappropriately, it can affect the whole programme of management...” (P5)

The participant then continued by suggesting the following:

“I think careful assessment should be done so that children don’t end up with long term problems ...” (P5)



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“The issue of record keeping should be taken seriously so that we can make follow ups on the children... unlike the way we just use registers...” (P4)

Different approaches to the management of upper limb fractures should be examined to be able to come up with the best possible management.

“Case studies should be done to see the type of methods to use in the treatment of patients comparing which method is more effective. Then from there we can evaluate the best method...” (P1)

“From the moment the cast is removed, there should be thorough assessment and we should also have a personal interest of taking up the case.”(P2)

Participant emphasised the need for updates on current trends in the management of upper limb fractures rather than relying on old literature.

“I think we need updates as on the treatment of upper limbs fracture on what other methods to use in treatment...” (P1)

“I think it is best if we had clinical presentations once in a while where we present on fractures and giving updates on how we are dealing and managing fractures... also on the prevention of complications.” (P3)

“Physiotherapists should be trained and be attached to certain workshops for non-operative care maintenance of fractures...” (P4)

The participants felt that there was no multi-disciplinary cooperation among the health workers which in turn could be contributing to the poor outcome in fracture management.

“I think we need to work as a team. We don’t work as a team. We should be involved in ward rounds, discuss and come up with solutions. I feel like if we have children with fractures, what we need is to be there to plan together. They (the doctors) know the

surgical and medical aspects and we (physiotherapists) know physical rehabilitation...”

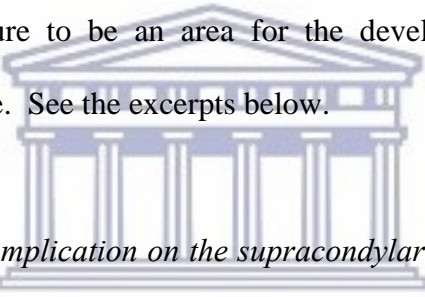
(P2)

5.4 EMERGING THEMES

Two themes emerged from the data analysis, namely complications and physiotherapy management.

5.4.1 Complications

Complications are inevitable in the management of upper limb fractures. Although supracondylar fractures were noted in literature to be an area for the development of complications, the participants did not feel the same. See the excerpts below.



“We don’t have much complication on the supracondylar fracture nowadays. I think it’s because of the way that we manage our patients. In the past years, children used to present with elbow stiffness. Maybe it’s because of the way they used to manage the patients.”(P5)

“Usually there is a full recovery with appropriate management of a supracondylar fracture, whether it is surgical or conservative treatment.”(P2)

5.4.2 Physiotherapy management

Participants mentioned how they have been addressing certain type of fractures in order to avoid complications, and the following was quoted.

“The frequency of applying P.O.P has been reduced ... we put a collar and cuff so that it can allow a bit of movement once in a while...” (P4)

“For the fracture of the elbow, therapy can begin within days of the initial injury, and continue throughout the bone healing and bone remodelling stages. Effectiveness of the treatment will vary, depending on the stage of rehabilitation. Early rehabilitation makes a difference in a functional limb in the prevention of stiffness...” (P1)

5.5 SUMMARY OF THE CHAPTER

Results of the qualitative data helped to understand the perceptions of medical doctors and physiotherapists regarding the role of physiotherapy in the management of upper limb fractures.

From the physiotherapists’ point of view, the following were mentioned:

- Certain doctors only consult with physiotherapists when they feel like it.
- The physiotherapist should make better use of opportunities to communicate with the doctors.
- Most of the physiotherapists are in favour of surgery to stabilise the fracture, to prevent prolonged immobilisation that could lead to the development of complications like stiffness.
- Stiffness was noted as the most challenging experience in the management of upper limb fractures.
- Other notable challenges include parents not bringing children for follow-up treatment sessions, lack of rehabilitation equipment and lack of time for proper rehabilitation due to heavy workloads.

- The main role of the physiotherapist is to mobilise the limb to prevent the development of stiffness and get the patient back to pre-fracture functional level.

Some of the perspectives of the medical doctors were as follows:

- Physiotherapists have an important role to play in the rehabilitation of patients with upper limb fractures.
- There were concerns about the lack of communication between the doctors and physiotherapists, the absence of the physiotherapist during ward rounds as well as the lack of follow up on the patients.
- Working together with physiotherapists assist with better outcomes for the patients.
- Physiotherapy should commence early enough to prevent the development of complications.
- Physiotherapists should be included in workshops and also educate doctors in rural areas of what exactly they can do with regards to the management of upper limb fractures.

The findings from both qualitative and quantitative results will be discussed in Chapter Six.

CHAPTER SIX

DISCUSSION

6 INTRODUCTION

In this chapter, the outcome of the study results will be discussed and compare with literature in the area of upper limb fractures in children. The profile of patients who sustained upper limb fractures from 1 January 2012 to 31 December 2014 as well as the perceptions of both the physiotherapists and doctors regarding their role in the management of patients following upper limb fractures is discussed.

6.1 PROFILE OF PATIENTS ADMITTED AT SOLWEZI GENERAL HOSPITAL

This section will discuss the profile of the patients who sustained upper limb fractures that was managed at Solwezi General Hospital, Zambia for the period of investigation.

6.1.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE CHILDREN

Data for a total of 385 patients admitted with an upper limb fracture between 1 January 2012 and 31 December 2014 to Solwezi General Hospital were recorded. The findings of this study were that the majority of the participants were aged 0-9 years old (72.2%) and 10-14 years old (27.8%), with radius/ulna being the most common fracture of the upper limb. The present study showed male predominance as 66.4% of the participants were male, a similar tendency also reported in a study by George et al. (2016) with male representation of 68%. This tendency may be explained due to the fact that boys are more active and therefore more prone to falls. Statistically more males than females had a radius/ulna fracture ($p=0.002$). These findings are

consistent with Grabala (2015) who reported in a Polish study that boys are affected twice as much as girls, with the area mostly affected being the radius/ulna. The analysis of the relationship between the variables revealed a statistical significance between gender and the fracture site. Researchers in Europe and the United States of America also showed a higher incidence of radius/ulna fractures in boys (Mäyränpää, Mäkitie & Kalilo, 2010; Dhar and Varghese, 2011). The mean age of the patients in the present study was 8 years and the majority of the participants (66.2%) were male. These findings are similar to that of Mansoor et al. (2015) who reported a mean age of 8.8 ± 4.6 years old for their participants.

There is a scarcity of current literature relating to the incidence of children presenting with upper limb fractures in children in Zambia as related to many studies done in other Africa countries (Hulme, 2010; Pretorius and Firth, 2010; Nwadinigwe, Ihezue and Iyidiobi, 2006; Chichom-Mefire and Fokou, 2013). A Zambian study by Mulla and Lungu (2002) showed that a total of 40 children presented with a supracondylar fracture when seen at the University Teaching Hospital (UTH). The mean age of the participants in their study was 6.9 years old and the ages ranged from 3-13 years old. Krabbe et al. (2003) conducted a retrospective survey on paediatric and adolescent fractures in Katete Zambia. Physical examination was used to assess the fracture type, Of 355 participants, 56 sustained fractures with the prevalence rate of 15-19% male and 11% female. The most common fracture was that of the wrist (39%).

More than a third (37.4%) of the participants in the present study sustained the fracture by falling on an outstretched hand and only 22.3% of the participants developed stiffness post-fracture. Several studies found falls to be the major contributing factor to upper limb fractures in children

(Admassie et al., 2015; Dhar and Varghese, 2011; Hedström et al. 2010; Rennie et al., 2007 ; Kopjar and Wickizer, 1998). This could be the case in our setting, as most children do engage in a many sport activities, even though this study did not collect information regarding the children's engagement in sport. However, other studies have accounted road traffic accidents to be the major cause of fractures in children (Pretorius and Firth, 2010; Chalya et al., 2012; Nwandinigwe et al., 2006). The differences in the cause of the fracture in the studies can also be attributed to socio-cultural dissimilarities in the various settings where the studies were conducted.

6.2 TYPES OF UPPER LIMB FRACTURES AND MECHANISM OF INJURY

The WHO (2008) reported that 90% of annual injuries occurred in children below the age of 18 years old and the causes included the following: RTAs, drowning, burns, falls and poisoning. Falls were also identified as a non-fatal injury globally which was similar to a study that was done in Singapore (Ong et al., 2016). In Thailand and Malaysia, RTAs were respectively the leading and second most common cause of injuries in children. Results from a study by Muriu (2016) are in line with that of the above mentioned Malaysian statistics where falls are the second leading cause of injury (accounting for 35% of all injuries) in children. This figure is similar to global studies which stated that falls have contributed to between 25% and 56% of all childhood injuries (Dhar and Varghese, 2011; Joeris et al., 2014).

The present study reports that a fall on an outstretched hand was the most prevalent cause of fractures among the participants and the radius/ulna was the most common area among fractured. The main causes of injuries are sport related, and playing. A statistical significance was found

between the type of fracture and the mechanism of injury ($p=0.022$). A study conducted in Olmsted County found that from 1999 to 2001, distal radius fractures due to an accident while playing accounted for 10% of all paediatric fractures (Khosla et al., 2003). However, Randsborg (2013) documented that sports-related injuries in the 10–14 year accounted for 39% of injuries respectively.

In Sub Saharan Africa, RTAs are on the increase, mainly due to rapid urbanisation. The present study revealed 18% of all injuries are due to RTAs. This result was much higher compared to results from studies conducted in Dar as Salaam and Maputo, whereby RTAs contributed to 15.2% and 14% of childhood injuries respectively (Museru et al., 2002).

Results from the present study revealed that most of the falls occurred in children older than 5 years old during play at home. In a community survey conducted in Tanzania, falls among young children were reported to occur almost exclusively at home. Boys were more affected than girls with a ratio of 3:1 (Muriu, 2016). The researchers reported that mostly boys sustained injuries in childhood and they also have a substantially higher risk for mortality as a result of falls, with the rate varying from 1.2:1 to 12:1 when compared with girls. This result is not different from a study conducted by Dhar and Varghese (2011). A possible explanation for this gender difference is that boys tend to be overactive, have risk taking behavior as well as being less supervised as compared to girls.

The present study found that the most prevalent fracture is that of the radial/ulna (60.3%), with a supracondylar fracture as the second most common fracture at 24.2%. These results are more or

less in agreement with a study conducted in Malaysia. Saw, Fadzilah, Nawar and Chua (2011) reported that fractures of the radius/ulna and supracondylar fractures accounted for 41.9% and 27.7% respectively. However, in a prospective study, Paudel and Thapa (2010) found supracondylar fractures to be the most common area of injury in children. Similar results to that of Paudel and Thapa (2010) were found in several researches conducted globally (Valerio et al., 2010; Kopjar et al., 1998). Clavicle fractures presented with the lowest incidence of 4.9% in the present study. This low incidence is in line with results from studies conducted by Mansoor et al. (2015) and Issin et al. (2015) which found that clavicle fractures only accounted for 6.44% and 6.6% respectively.

Mansoor et al. (2015) reported that in all age groups, fractures of the radius/ulna were the most common, a results also similar to the present study. Although radius/ulna fractures resulted more often from all the possible mechanisms of injury, less development of complications were noticed compared to participants that sustained a radius/ulna fracture (Randsborg and Sivertson, 2009). Radius/ulnar fractures have particularly low rates of complications in the present study.

In the present study a statistical significance was found between the age and the type of fractures ($p=0.000$). The highest incidence of fractures occurred in the age group 5-9 years old (72.2%) with the radius/ulna mostly affected. The age group 10-14 years old showed the least incidence (27.8%). Mansoor et al. (2015) also reported that until at the age of 12 years old, children showed high incidence in the number of fractures in general. Nellans et al. (2012) explained that the tendency of a higher incidence in the older age group could be that after puberty, the bones become stronger and resistant to trauma due to the high bone mineral content. This finding was

however in contrast with a study by Clark (2014) which found a statistically significant higher proportion of injuries in the 10–14 year age group. The results of Clark (2014) concur with that of a Nigerian study by Agaja and Ehalaiye (2009) conducted on 106 patients, 60 males (56.6%) and 46 (43.4%) females. The researchers reported that the age group 10-14 years old was the most vulnerable (40.6%) followed by 6-9 years old (31.1 %) and 1-5 years old (25.5%). This is not in agreement with the current study which reported that the most vulnerable age group was from 0-9 years old. Agaja et al. (2009) also reported that the age group 0-1 year old is rarely involved in trauma (2.8%); a finding consistent with the current study.

6.3 MEDICAL MANAGEMENT

According to Arora et al. (2014), the type of treatment will depend on the degree of displacement and most forearm fractures can be treated without surgery. Globally, undisplaced fractures are managed conservatively with a splint or cast, while displaced fractures are managed surgically (van Egmond et al., 2012). In the present study, the majority of the participants (75.7%, n=70) with a supracondylar fracture were treated surgically while those with a radius/ulnar fracture received conservative treatment. Mulla and Lungu (2002) reported that after surgery of the supracondylar fracture, 45% of the patients had less than 5 degrees loss of range of motion while 7.5% had a poor result due to a varus deformity that needed surgical correction at a later stage.

Van Egmond et al. (2012) stated that there is some controversy in literature regarding the management of radius/ulnar fractures. Although the majority of radius/ulnar fractures can be treated by closed reduction, the interest of surgical treatment has continued to increase even though there is lack of quality evidence to support this. Pretell-Mazzini et al. (2011) stated that

closed reduction and percutaneous pinning is the most preferred type of treatment whereas Sinikumpu et al. (2013) stated that closed reduction and casting are the primary means of fracture management for radius/ulnar fractures. In addition, numerous studies found no significant difference in the development of complications whether the radius/ulnar fracture was managed with ORIF or other therapeutic options (Hussain et al., 2010).

6.4 PHYSIOTHERAPY MANAGEMENT

Physiotherapy focuses on pain reduction, healing, rapid recovery of mobility, and avoidance of late complications (Kraus and Wessel, 2010). An individual tailored physiotherapy rehabilitation programme is required for each patient. The content of the rehabilitation programme should be patient specific (Bruder et al., 2013). In the present study, physiotherapists mentioned that their main role in the management of upper limb fractures is to stabilise the fractured bones, mobilise the joint to maintain the available range of motion in order to avoid the development of stiffness. Furthermore, in the presence of muscle atrophy, strengthening exercises are encouraged to gain muscle power and to avoid the development of neural-related symptoms like numbness. A systematic review by Murdoch, Taylor and Dodd (2014) described how weakness of the muscles surrounding the fracture site can persist long after full bone healing has occurred and that return of strength may take six months or more following a fracture. Therefore physiotherapy will effectively aim at restoring the range of motion and gaining strength and function.

Fielder et al. (2013) stated that physiotherapy is responsible for rehabilitation following a fracture. Physiotherapists assess and treat acute, sub-acute and chronic conditions with

modalities such as manual therapy (which may include joint mobilisations, manipulation and soft tissue techniques), exercise therapy, electrotherapy and splinting. Treatment can help restore the patient to full function following a soft tissue injury or fracture. Keppler et al. (2005) stated that there is a more rapid return to normal or near normal elbow range of motion for children receiving physiotherapy management. Literature has shown the significance of physiotherapy in decreasing the development of complications. MacDermid et al. (2012) reported that physiotherapy intervention reduces the incidence of post-fracture stiffness. The present study found that of the 86 participants (22.3%) that developed post-fracture stiffness, more than three quarters (89.5%; n= 77) received physiotherapy. There was, however, no significant association between post-fracture stiffness and whether the patient received physiotherapy management or not (p=0.321).

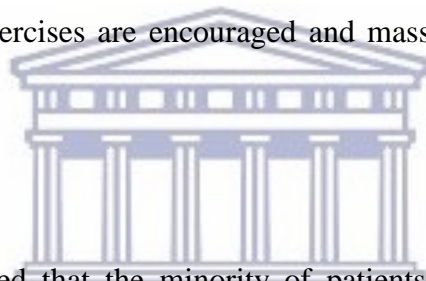
6.5 INTERVENTIONS GIVEN

In the present study, three interventions were used to manage patients with post fracture stiffness, namely exercise therapy; electrotherapy and manual therapy. The majority of the participants that received physiotherapy treatment (87.0%; n=67) had exercise therapy. This finding is echoed by MacDermid et al. (2012) who reported exercise interventions to be the modality most frequently employed at any stage of rehabilitation. These include active range of motion, stretching, strengthening and functional exercises.

Leung and Cheing (2008) mentioned the use of heat and this was proven to have increased the tissue extensibility and facilitation of joint range of motion. Deep heat was reported to increase extensibility in the absence of stretching in a double blinded repeated trial. The current study also uses heat therapy as a modality for the reduction of pain. Although the use of heat to reduce pain

in general is in agreement with literature, no specific literature was found that focuses on heat as a treatment modality used in the rehabilitation of elbow fractures. Therefore there is need for further studies on its usage as a modality included in the management of elbow fractures.

Much literature was found on the effectiveness of massage in rehabilitation. A recent systematic review by Ernst et al. (2007) argued that although massage is employed in the treatment of a range of conditions, its effectiveness was not proven in the use after an elbow fracture. In the qualitative section of the above mentioned systematic review, physiotherapists did mention the use of massage as a treatment modality for the treatment of muscle atrophy and to mobilise the joint or limb. Strengthening exercises are encouraged and massage and ultra sound is used in cases of soft tissue contractures.



The present study also observed that the minority of patients (3.9%, n=3) received manual therapy as a treatment modality. Stump, Sizer and Brismée (2014) mentioned that manual therapy was effective in restoring function after a fracture of the distal radius/ulna. Having indicated this, there is preliminary evidence to support the role of physiotherapy in the rehabilitation of upper limb fractures, which provides support for particular procedures in the process of care. Kay, McMahon and Stiller (2008) demonstrated that physiotherapy and advice was found to be beneficial compared to no intervention in the short term in the management of patients with a distal radius fracture. Early commencement of exercise was found to be beneficial in patients with conservatively managed proximal humeral fractures. Supervised physiotherapy, in addition to a home exercise programme, was found to increase wrist range of movement in patients with conservatively managed distal radius fractures (Taylor et al., 2007).

6.6 THE ROLE OF PHYSIOTHERAPY IN THE MANAGEMENT OF UPPER LIMB FRACTURES IN CHILDREN

6.6.1 General awareness of medical doctors

Knowledge of the skills and capabilities of another profession within the medical field and collaborative and spirited team work are needed for optimal outcomes. If not, management of a particular case may not yield the expected results, no matter the effort. The role of physiotherapy in the management of upper limb fractures in children requires some experience and knowledge on that part of the medical doctors. A better awareness may help foster team work and consequently contribute to better results of children presenting with upper limb fractures. In many African countries, physiotherapists are still dependent for patients from a referral from a doctor. Ogiwara and Nozoe (2005) reported that less than 30 per cent of patients were referred for physiotherapy by doctors. It is of great concern as the patient will not receive the necessary and optimal rehabilitation if a doctor is not well informed about the role of physiotherapy

However, in the present study, even though not all the medical doctors were aware of the role that physiotherapists can play in the management of upper limb fractures in children, they still referred their patients for physiotherapy. The lack of awareness of the role of physiotherapy urgently calls for more promotion from the physiotherapy profession's side as well as dynamic team work between doctors and physiotherapists (Kutty et al., 2013). The results of the present study are promising as one of the doctors mentioned that physiotherapy is a very important profession, because it plays a big role in the diagnosis, treatment and rehabilitation of patients with different conditions; not only fractures. A South African study by Puckree al. (2011) had similar results than the present study as it also showed that medical doctors were aware of the role of physiotherapy. On the other hand, Ogiwara and Nozoe (2005) stated that 92% of the

participants in their study indicated that they had only heard about the role of physiotherapy for the first time ever when they completed the survey.

6.6.2 Perceptions of medical doctors regarding the capabilities of physiotherapists

Most of the medical doctors voiced that they involve physiotherapists to assist with improving the patients' outcomes. Although the majority of the doctors mentioned that the physiotherapists are very helpful and cooperative in the management of their patients, one participant mentioned the absence of the physiotherapist during ward rounds. In addition, lack of communication between physiotherapists and doctors could also hamper positive outcomes for the patients. This leads to referring a patient only after the development of a complication. This tendency is in correlation with studies by Mulla and Lungu (2002) who reported that the orthopaedic team took long to refer patients and by then the fracture has mal-united and stiffness has set in. According to Ramli (2003), most doctors agreed that physiotherapy plays an important role in the health care system and that there is a good and effective communication level between doctors and physiotherapists.

A study by Shimpi et al. (2014) observed that decision of treatment was left to the physiotherapists. It was further stated that physiotherapists have a good knowledge on their role and are competent to make decisions about patient care, whether during assessment/treatment and when giving advice. Ramli (2003) further stated that physiotherapy have a quick response when it comes to patient referrals. Doctors reported that the reason for them referring a patient for physiotherapy is solely for the benefit the patient might experience from the assessment and therapeutic treatment that is provided by the physiotherapist. A study by Odebiyiet al. (2010)

showed that doctors did not provide any diagnosis but expected physiotherapists to diagnose and design a treatment plan for the patient. This finding concurs with that of, Shimpi et al. (2014) who reported that physiotherapists are trained and qualified enough to identify the patients' problems and to make clinical judgements within their scope of practice.

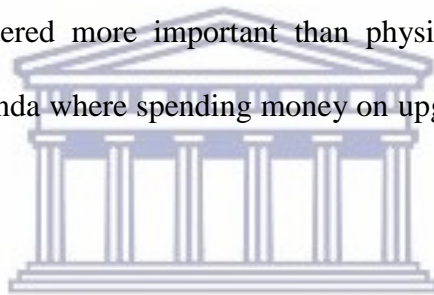
Most doctors commented that physiotherapists reported back to them, and reiterated the importance of mutual communication in order to prevent any problems. Communication, whether verbal or via the telephone is very important because it leads to increased awareness and information exchange and ideas; thus resolving any queries that may exist or develop faster. Acharya et al. (2012) mentioned that doctors that consult with physiotherapists showed a higher degree of respect and a great interaction with exchange of views and ideas. This shows an equal need of each other in both fields. Acharya et al. (2012) further reported that research highlighted that most doctors were aware about the role physiotherapists play in orthopedic conditions. This concurs with results of a study by Childs et al. (2005) where the researchers reported that physiotherapy is key to play a major role in the management of musculo-skeletal conditions.

6.6.3 SUGGESTED IMPROVEMENTS

Doctors expressed the need for collaboration with the physiotherapist. This could only be achieved if a physiotherapist is specifically allocated to a ward so that proper assessment and treatment can be done for each patient. This suggestion is echoed by Kutty et al. (2013) which stated that in order for an appropriate treatment plan and recovery choices for the patient, doctors and other health care professionals should work closely with physiotherapists. The World Confederation for Physical therapy (WCPT) in 2013 suggested that a doctor can diagnose,

relieve symptoms with medication and perform surgeries, but a physiotherapist would employ rehabilitation techniques that assist the patients with a speedy functional recovery.

The Zambian Ministry of Health has come up with measures to educate doctors on the new methods of fracture management. One participant also suggested that hospital management should motivate physiotherapists to attend such workshops. There is a serious challenge for physiotherapy education in the form of funding in order to upgrade physiotherapy in African countries. The hospital management could also contribute to the costs involved for physiotherapists to attend such workshops. Frantz (2007) stated that when it comes to education, doctors and nurses are considered more important than physiotherapists. This is similar in countries like Zambia and Rwanda where spending money on upgrading rehabilitation therapists is not regarded as a priority.



6.7 PHYSIOTHERAPISTS' PERCEPTIONS REGARDING THEIR ROLE IN THE MANAGEMENT OF UPPER LIMB FRACTURES IN CHILDREN

The physiotherapists' perceptions regarding their role in managing children with upper limb fractures were based on five predetermined themes, namely the role of physiotherapy, consultation with the doctor, process of care, challenges experienced and suggested improvements. There was an agreement that if physiotherapists understand the role they play in the management of upper limb fractures in children, they could assist other team players like doctors to better understand **the role of the profession** in a multi-disciplinary team. Therefore the role of physiotherapy in fracture management starts with the physiotherapists themselves. This is in agreement with an Australian study by Shafqat et al. (2012) as well as research by

Abichandani and Radia (2014) which showed that physiotherapists were well aware of their role when it comes to the management of fractures.

With regard to **consultation with the doctor**, it is paramount that the physiotherapist consult the doctor whenever managing upper limb fractures. Different communication channels are available, including ward rounds, patient records and telephone conversations. In the present study, participants mentioned that communication is via nurses in the ward as well as the patient records/notes. Telephone conversations are very difficult as the nurse cannot always leave the patient alone to attend the phone call.

In the current study, one participant disputed the issue of doctors prescribing a treatment plan for physiotherapists to follow. This is of great concern as the participant felt that the doctor should only refer a patient for physiotherapy, and not give instructions on the type of exercises or treatment modalities to use on patients. This is similar to the findings of Maruf, Ekediegwu, Akinpelu and Nwankwo (2012) regarding physicians' prescription of modalities in the referral of patients. This way of doing is an indication of the wrong attitude and/or poor knowledge about the role of physiotherapy in health care delivery for physiotherapists. As mentioned before, in Zambia, like in most of African countries, physiotherapists are not first-line practitioners. Doctors tend to refer patients for physiotherapy management, prescribing the type of exercises and treatment modalities to patients. This is of great concern as most of the prescribed treatments were not even appropriate. In the USA, it was identified that doctors lacked knowledge of the appropriate physiotherapy treatment modalities. This tendency is echoed by Liu et al. (2006) which found that the extent of the appropriate physiotherapy services or modalities some patients

require is not fully understood by the doctors due to lack of knowledge of the profession. This calls for enhancement of collaboration between physiotherapists and doctors. Another suggestion is to introduce self-referral to physiotherapy. This concurs with literature by Pucree et al. (2011) and Maruf et al. (2012). The latter researcher found that 88% of the participants in a study conducted in the United Kingdom were supportive of being able to refer themselves to physiotherapy. When there is adequate perception of the role of physiotherapy by stakeholders, they can make an informed decision on self-referrals.

6.8 PROCESS OF CARE

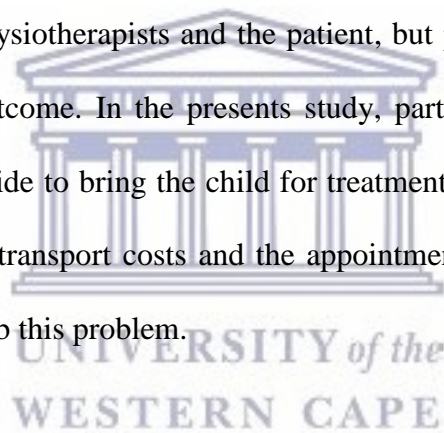
6.8.1 General

The participants mentioned that the main aim of the process of care is to rehabilitate the patient to his/her pre-injury functional level. The emphasis is to start physiotherapy as early as possible (Parmelee-Peters and Eathorne, 2005). During an interview in the present study, participants mentioned that when it is time for removal of the plaster, an x-ray is taken to confirm callus formation and proper healing of the fracture. Similarly, Vigneron (2014) stated the importance of doing an x-ray to check for healing before commencement of rehabilitation.

Participants suggested that early intervention is necessary in the prevention of stiffness. Mobilising exercises are usually done for those patients that present with any complications in order to increase the range of motion and ADLs are encouraged when the limb is in a functional position. In order to ensure optimal outcome, rehabilitation is done by performing pain-free flexibility and strengthening exercises to curb the loss of range and strength due to immobilisation (Vigneron, 2014).

6.8.2 Challenges experienced

The participants agreed that there are challenges especially where complications of fractures are concerned. In terms of complications, the participants responded that the most common complication was stiffness, being soft tissue or the joint itself after a supracondylar fracture. Based on this statement, participants expressed a need for early rehabilitation to prevent as much as possible the development of stiffness due to immobilisation. George et al. (2016) stated that fractures in children could be very challenging and that 60% of those with a fracture usually undergo surgery due to complications. There is a high rate of the development of complications in fractures of the elbow poor results are achieved when treated non-operatively. Treatment should not only involve the physiotherapists and the patient, but parents should also play a role in order to have a positive outcome. In the presents study, participants felt that most parents default on the treatment or decide to bring the child for treatment only after complications such as stiffness set in. Funding of transport costs and the appointment of a physiotherapist at each and every rural clinic could curb this problem.



Workload is another challenge mentioned by the participants. Solwezi General Hospital has a very small department, yet it caters for a large number of patients. Due to free services offered, more patients are referred to the department, leading to an even higher workload. This is hampering the effectiveness of treatment because less time is given to each child and most of them do exercises unsupervised.

More than 60% of the Zambian population are based in rural areas, which makes it difficult for them to access health services. The government has addressed the inequity to access the health

services by abolishing user fees (MOH, 2011). The study mentioned that the majority of the children who sustain fractures came from rural areas and had to walk a long distance to receive therapy. This could have been the reason why parents defaulted in bringing the children for treatment; especially if they do not see any improvement. This is similar to Mulla and Lungu (2002) who mentioned that after the patient was discharged, lack of financial means and transport problems could lead to patients not being consistent in their follow-up appointments. The same sentiment is shared by a Kenyan study where Gona et al. (2013) mentioned that the majority of people have to travel long distances to get the therapy. This definitely has a negative impact on the outcome of the patient.

6.8.1 Suggested improvements

There were suggestions from participants to help address the main challenges in the management of upper limb fractures, namely improvement in assessment and examination, record keeping, holistic collaboration among health professionals, lack of equipment, work load, conducting case studies and new updates in treatment methods.

Lack of collaboration among team members was another challenge that was raised by participants in the present study. The participants suggested that teamwork should be implemented. They should be involved in ward rounds so that they can assess the patient and come up with the same treatment plan. Participants expressed that in as much as doctors know the surgical and medical aspect, physiotherapists are more knowledgeable about the rehabilitation. Physiotherapists need skills and appropriate communication for an effective practice. This can be achieved by coming up with a common goal, understanding, respect and

willing to share knowledge with others. In Japan Ogiwara et al. (2005) conducted a study on the doctor-physiotherapy relationship. It was stated though debatable that the closest profession to medicine in terms of clinical skills was physiotherapy. There is very good collaboration between doctors and physiotherapists, unlike with any other health care professionals. The findings of Liu and Fletcher (2006) also implied that despite the high motivation shown by physiotherapists in the multidisciplinary team, doctors tend to regard physiotherapists as technicians rather than a profession.

The researcher found that there was an issue of poor record keeping of patients. It was mentioned that physiotherapists depend on registers which are not even consistent. Some participants complained that sometimes patients are not recorded in the register but they are only given a dates of appointments for their treatment sessions in form of a small card which eventually becomes of no use when the patient is discharged. This is problematic when doing reassessments or follow up on the patients. The hospital had looked into that and provided one computer to the department and yet it was only used for personal interest. This is of great concern as the Australian Physiotherapy Association (APA) in 2009 stated that physiotherapy practice record-keeping is very vital, ethical and a legal requirement. Ceusters and Smith (2006) shows that electronic record keeping is more advantageous than paper clinical records. However, there is a lack of implementation of electronic record-keeping at the hospital that participated in the present study. The Ministry of Health (2011) records that due to the inefficiency in the health care system in Zambia, in terms of inadequate human capacity, inconsistency of supply of essential drugs and medical supplies and appropriate equipment, the outcome of management in patients tends to be very poor.

Kaplan et al (2013) stated that physiotherapists are required to develop and utilise a wide based framework of practice and conform to current trends in medical practice. The current medical practice emphasises the need for evidence based on several models and collaboration holistic approach based specifically on the WHO-ICF model of health. The use of case studies on the different types of treatment that could be effective was suggested. Participants felt the need for an update on the current trends of management, rather than relying on old literature. Clinical presentations on updates to manage fractures in order to prevent complications were emphasised. Continuation of professional development is a good incentive which helps to retain staff members and helps guarantee competence (Asamani, Amertil & Chebere, 2015). Training programmes in the form of workshops enhance a good management strategy. Workshop attendance should involve all the therapists, and not only certain individuals. Some participants mentioned that they attended a workshop on fracture management which was very beneficial. This training has helped them gain knowledge and better understanding of fracture management. Ferreira, Reis Neto, Vasconcelos and Souki (2016) mentioned that good quality service delivery can be achieved by requiring a positive motivation and that motivation and availability of skill is important for health workers in order for them to come up with appropriate services to the patients.

Physiotherapy as a profession is mandated to practice on the decision of evidence-based practice which is based on the current research and development. Rankin et al. (2012) of the Chartered Society of Physiotherapy (CSP) stated that physiotherapists are active in research activities; therefore, they should be up to date with the latest evidence-based interventions that could improve the quality of life of their patients. Sarwar, et al. (2015) supports this study and further

stated that physiotherapists are known as educators to colleagues, sharing their awareness and clinical capability in ensuring that the patient receives the most current and effective treatment for their condition. Education programmes to other physiotherapy colleagues and other health care professionals are provided, thus contributing to the continued updating of their professional knowledge.

In the management of patients, participants mentioned how they have been addressing certain type of fractures in order to avoid complications. It was suggested that the frequency of P.O.P application be reduced in order to allow some movement once in a while and that therapy should commence as soon as possible, and continue throughout the stages of bone healing. Early rehabilitation makes a difference in a functional limb as it prevent the development of stiffness. The preference of surgical management to prevent prolonged immobilisation that could lead to complications was also raised. Children could benefit from operative treatment because it minimises the time that the child is in a fixed position, and it calls for early mobilisation compared to the conservative methods currently used.

6.9 SUMMARY OF THE CHAPTER

This chapter discussed the major findings of the study in line with the study objectives and further related to similar or different findings from available literature. There was a limitation of studies in Zambia on perceptions of health care professionals regarding the role of physiotherapy in management of upper limb fractures in children, hence this study adds more knowledge to the existing gap. The next chapter will present the summary of the study, conclusion and limitations and lastly the recommendations.

CHAPTER SEVEN

SUMMARY, CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

7 INTRODUCTION

The chapter presents a summary of the main findings of the study. The conclusions and recommendations that have been drawn from the results of the study are outlined while the limitations experienced during the process of the research are also stated.

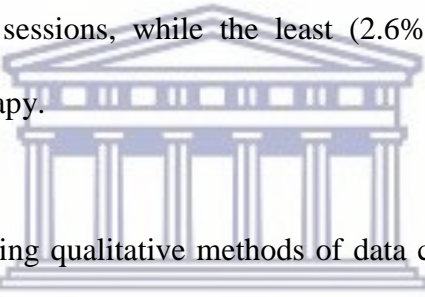
7.1 SUMMARY OF THE STUDY

The objectives of the study were to establish a profile of patients admitted with upper limb fractures and to describe the process of care of patients with upper limb fractures both medical and physiotherapy management. In addition, the current study explored the perceptions of health care professionals regarding the role of physiotherapy in management of upper limb fractures in children at Solwezi General Hospital, Zambia.

The findings showed an increase in the incidence of upper limb fractures in children in Zambia, which coincides with literature from both developed and developing countries.

A descriptive retrospective quantitative design was used to collect information from the patients' record files at Solwezi General Hospital from the period of 1 January 2012 to 31 December 2014. Results indicated that the age of the participants ranged from 0-14 years old, with the mean age of 8.0 years old (SD=2). Overall, males accounted for 66% (n=255) while females were 33.8% (n=130). A fall on an outstretched hand was the most common mechanism of injury

(37.4%). The most prevalent fracture in both gender was the radius/ulna (43.1%) in males and (17.1%) in females. The majority of the participants (n=70; 75.5%) with a supracondylar fracture were treated surgically and the majority of radius/ulnar fractures received conservative treatment (POP and a sling). A total of 86 participants (22.3%) developed post-fracture stiffness. Of the 86 participants that developed post fracture stiffness, 62.8% (n=54) were male and 37.2% (n=32) were female. Gender differences were noted, as significantly more male than female participants developed stiffness after the fracture ($p<0.001$). More than three quarters of the participants (89.5%; n= 77) received physiotherapy. The interventions used included exercise therapy, electrotherapy and manual therapy. The majority of the participants (75.3%; n=58) received 31 to 40 physiotherapy treatment sessions, while the least (2.6%; n=2), attended less than 20 treatment sessions of physiotherapy.



An exploratory study design, using qualitative methods of data collection was employed in the present study to explore the perceptions of medical doctors and physiotherapists regarding physiotherapists' role in the management of children with upper limb fractures. The study population consisted of doctors and physiotherapist working at Solwezi General Hospital. The sample had the minimum of four (4) doctors with ages ranging between 28 and 42 years old (mean age=36.63 years old; SD=7.17). Their work experience ranged between 4 and 20 years (mean=10 years; SD=4.79). The in-depth interviews were conducted with all participants in relation to the perceptions regarding the role of physiotherapy in management of upper limb fractures in children until the point of saturation. Participants expressed that physiotherapists play a major role in management of fractures. Despite all this, shortcomings mentioned included the lack of involvement from the physiotherapists in the team, especially during ward rounds.

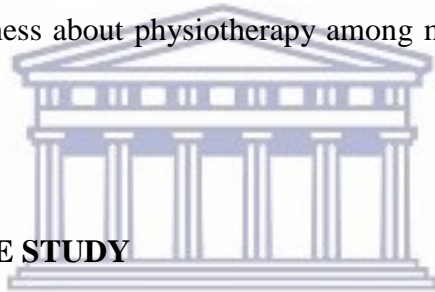
Suggestions for an improved work relationship were also stated, e.g. allocations in mobile hospitals, involvement in workshops and upgrading in educational training.

Results from the interviews with the physiotherapists highlighted their awareness of the role they have to, or can play in fracture management in children, and the importance of being involved in the multi-disciplinary team. Participants have a good approach towards the process of care during management. However, issues were raised about challenges they face at the hospital. Some of the challenges mentioned were workload due to the increasing number of patients, which is hindering effective prognosis, shortage of medical supplies, the lack of a holistic approach due to lack of collaboration between doctors and therapists; all aspects that could contribute to poor outcomes of management. Another concern for the physiotherapists was that doctors mostly consult physiotherapy when a complication has already developed. The participants also felt that doctors should not prescribe specific treatment for patients, as most of the prescriptions were not appropriate for the patients.

Regardless of the challenges experienced, both doctors and physiotherapists that participated in the interviews perceived physiotherapy as an important profession, and that if the area of clinical assessment and examination is improved, it could decrease the number of complications that develop in children with upper limb fractures. Participants advocate for workshops and clinical presentations and case studies regarding the latest literature relating to management, in order to prevent the long-term disabilities. These sessions should include all relevant health care professionals. Finally, participants emphasized a multi-disciplinary and holistic approach in order to achieve common goals.

7.2 CONCLUSION

The researcher believed that the current study has met its aims and objectives. The findings of the study are supported by literature. Exploring the perceptions of doctors and physiotherapists regarding the role of physiotherapy in management of upper limb fractures evidently showed that both doctors and physiotherapists had good knowledge on fracture management. Doctors perceived that physiotherapists are healthcare professionals involved in the assessment, treatment and injury prevention in people of all age. Results, however, showed that there are still areas for improvement regarding awareness of the role of physiotherapy in the management of children with upper limb fractures in terms of early referral and specialised physiotherapy services to be offered. In general, the awareness about physiotherapy among medical doctors are appreciable and satisfying.



7.3 LIMITATIONS OF THE STUDY

At the beginning of the chapter, a summary of the study, conclusions and recommendations are described and explained. However, the current study had some limitations, as stated below.

- The current study had a small sample size which limited generalisation of the findings. Given a small sample size, and the fact that physiotherapists and doctors were from the same hospital, findings can only be generalised to the hospital where the study was conducted. For the purpose of further investigation, the current results must be explored with a larger sample.
- There researcher found that most of the patient folders/files were incomplete, therefore negatively impacted on the data collection process.

- Due to the nature of the methodology used in the current study, the comparison of the results to other studies done globally was difficult.
- Despite the limitations, the researcher believes that the study makes a valuable contribution to the existing literature. The results add to the body of knowledge concerning the perceptions of health care professionals regarding the role of physiotherapists in the management of upper limb fractures in children.

7.4 RECOMMENDATIONS

In order to come up with an effective treatment of fractures in children, it is very important that both doctors and physiotherapists have sufficient knowledge. Since physiotherapy is an essential component in the management team of patients with fractures, effective and efficient practice is cardinal in the prevention of complications and improving the quality of life of patients. Therefore, based on the findings of the study, the following recommendations are made:



7.4.1 Research

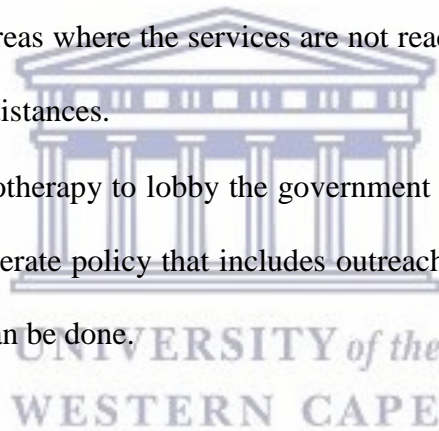
- There is need for further research concerning the management of fractures in children
- There is need for the Zambia Society of Physiotherapy (ZSP) to publicise and improve physiotherapy awareness to globally recommended professional standards.
- More research in this field is recommended. A study using a relatively larger sample should be done in order to evaluate the role of physiotherapy in children with fractures.
- There is a serious need for evidence based research to explore the perceptions of health care professionals regarding the role of physiotherapy. Future research would be

beneficial to complete the existing study with a larger sample size in order to increase the power of the study by obtaining more information.

- Perceptions of doctors and physiotherapists may vary in different parts of the country. Therefore, more studies in other settings should be carried out to obtain adequate information.

7.4.2 Policy

- There is need for both national and local government to support physiotherapy services in their programmes by increasing the availability and accessibility of physiotherapy services in other rural areas where the services are not readily available so that people do not have to travel long distances.
- There is need for physiotherapy to lobby the government through the Ministry of Health to come up with a deliberate policy that includes outreach programmes where follow-up sessions with patients can be done.



7.4.3 Training

- There is a need for more physiotherapists to be trained in various approaches in the management of children with fractures.
- There is need for more clinical presentations regarding the awareness of fracture management amongst the multi-disciplinary team. Workshops should not be attended by same people but there should be some alternations within the department on the attendance in order for all to acquire the knowledge among the team members.

7.4.4 Holistic Approach

- Doctors and physiotherapists should strengthen their communication and work closely in helping patients. There is need for interaction among health care members for better service delivery.

7.5 SUMMARY OF THE CHAPTER

The final chapter summarized the findings of the study. In addition, limitations and recommendations of the study are also given.



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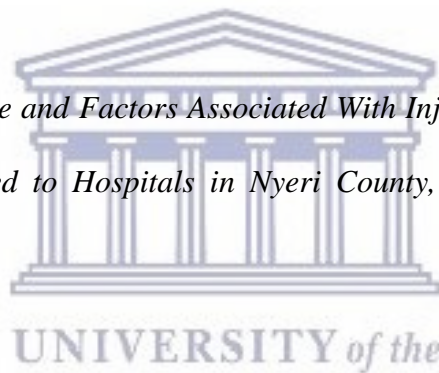
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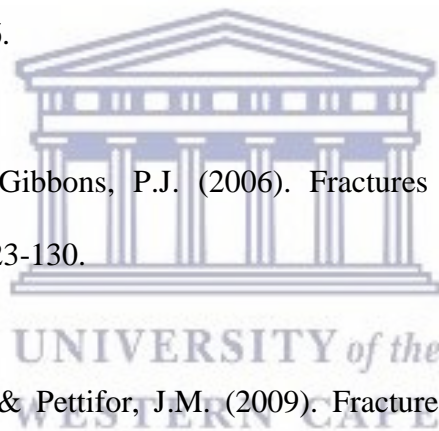
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APPENDICES

APPENDIX 1

DATA EXTRACTION SHEET

SECTION A

1.1 Social demographic information

1. Gender (tick the appropriate) Male Female

2. Age (years) -----

SECTION B

1.2 Characteristics of fractures

a) Type of fractures

- Supracondylar
- Radius/ Ulna
- Humeral fractures

b) Area of fractures

- Proximal 1/3 of humerus.....
- Head of humerus.....
- Neck of humerus
- Radius/ Ulna.....
- Clavicle.....

Other.....

c) Types of complications

i) Developed complication? Yes.....No.....

1.3 Mechanism of injury

a) Fall on an outstretched hand

b) Direct blow

c) Road traffic accident (RTA)

d) Osteoporosis (disease)

e) Fall from a height

SECTION C

1.4 MEDICAL MANAGEMENT

a) Any surgery done

i) Closed reduction

ii) Open reduction with internal fixation (ORIF)

b) Treatment given

c) Any referrals

SECTION D

1.5 PHYSIOTHERAPY MANAGEMENT

- a) Has the patient received physiotherapy after admission? Yes..... No.....
- b) Time of commencement of physiotherapy since admission (in days):
- c) Total number of physiotherapy sessions:
- d) Any evaluation (Reassessment)
- e) Any treatment modalities used
- Electrotherapy
 - Manual therapy
 - Exercises
 - Other

APPENDIX 2

INTERVIEW GUIDE PHYSIOTHERAPISTS

Name..... Age..... Gender.....

Working experience..... Code..... Date.....

1. What do you know about the role of physiotherapy in management of upper limb fractures in children?
2. What are some of the perceptions of physiotherapy regarding your role in management of upper limb fractures in children?
3. Which therapeutic modalities do you often prescribe?
4. What are some of the challenges that you face in managing children with upper limb fractures?
5. How is your involvement with doctors when it comes to managing of fractures?
6. Which areas do you suggest should be improved?
7. Anything you want to add?

APPENDIX 3

INTERVIEW GUIDE FOR DOCTORS

Name..... Age..... Gender.....

Working experience..... Code.....Date.....

1. What are some of the perception you have regarding the management of upper limb fractures in children?
2. What do you know about the role of physiotherapy in management of upper limb fractures in children?
3. What are some of the comments you have working with physiotherapists in fracture management?
4. What are some of the challenges you encounter in fracture management?
5. Which areas do you suggest should be improved?
6. Anything you want to add?



UNIVERSITY of the
WESTERN CAPE

OFFICE OF THE DEAN
DEPARTMENT OF RESEARCH DEVELOPMENT

08 June 2015

To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape approved the methodology and ethics of the following research project by:
Ms L Mubanga (Physiotherapy)

Research Project: The role of physiotherapy in management of
upper limb fractures in children.

Registration no: 15/4/49

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study.

A handwritten signature in black ink, appearing to read "Patricia Josias".

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

Private Bag X17, Bellville 7533, South Africa
3rd: +27 21 959 2988/2948 . F: +27 21 969 5170
E: pjosiasf@uwc.ac.za
ivrvw.uis@uwc.ac.za

A graphic element consisting of a dark blue triangle pointing upwards, with a white and yellow curved line along its left side. The text "A place of quality, a place to grow, from hope to action through knowledge" is written in white at the bottom right of the triangle.

A place of quality,
a place to grow, from hope
to action through knowledge



APPENDIX 5

33 Joseph Mwilwa Road
Rhodes Park, Lusaka
Tel: +260 955 155 633
+260 955 155 634
Cell: +260 966 765 503
Email: eresconverge@yahoo.co.uk

I.R.B. No. 00005948
EWA. No. 00011697

17th August, 2015

Ref. No. 2015-June-031

The Principal Investigator
Ms. Louise Mubanga
The University of Western Cape
Dept. of Physiotherapy
P/Bag X 7535 Bellville
REPUBLIC OF SOUTH AFRICA

Dear Ms. Mubanga,

**RE: PERCEPTIONS OF HEALTH CARE PROFESSIONALS REGARDING
THE ROLE OF PHYSIOTHERAPY IN THE MANAGEMENT OF UPPER
LIMB FRACTURES IN CHILDREN AT SOLWEZI GENERAL
HOSPITAL, ZAMBIA.**

Reference is made to your corrections dated 6th August, 2015. The IRB resolved to approve this study and your participation as principal investigator for a period of one year.

Review Type	Ordinary	Approval No. 2015-June-027
Approval and Expiry Date	Approval Date: 17 th August, 2015	Expiry Date: 16 th August, 2016
Protocol Version and Date	Version-Nil	16 th August, 2016
Information Sheet, Consent Forms and Dates	• English.	16 th August, 2016
Consent form ID and Date	Version-Nil	16 th August, 2016
Recruitment Materials	Nil	16 th August, 2016
Other Study Documents	Data Extraction Sheet, Interview Guide	16 th August, 2016
Number of participants approved for study	17	16 th August, 2016

Specific conditions will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

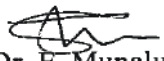
Conditions of Approval

- No participant may be involved in any study procedure prior to the study approval or after the expiration date.
- All unanticipated or Serious Adverse Events (SAEs) must be reported to the IRB within 5 days.
- All protocol modifications must be IRB approved prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address.
- All protocol deviations must be reported to the IRB within 5 working days.
- All recruitment materials must be approved by the IRB prior to being used.
- Principal investigators are responsible for initiating Continuing Review proceedings. Documents must be received by the IRB at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Any documents received less than 30 days before expiry will be labelled “late submissions” and will incur a penalty.
- Every 6 (six) months a progress report form supplied by ERES IRB must be filled in and submitted to us.
- ERES Converge IRB does not “stamp” approval letters, consent forms or study documents unless requested for in writing. This is because the approval letter clearly indicates the documents approved by the IRB as well as other elements and conditions of approval.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of ERES Converge IRB, we would like to wish you all the success as you carry out your study.

Yours faithfully,
ERES CONVERGE IRB

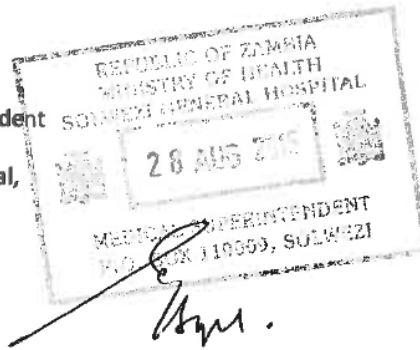

*8 Dr. E. Munalula-Nkandu
BSc (Hons), MSc, MA Bioethics, PgD R/Ethics, PhD



APPENDIX 6

Solwezi General Hospital,
P.o Box, 110009
SOLWEZI.
28th august, 2015.

The Medical Superintendent
Solwezi General Hospital,
Po Box 110009,
Solwezi.



Dear sir/ madam

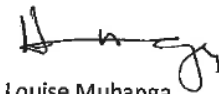
RE: CLEARANCE AND PERMISSION TO CONDUCT RESEARCH AT SOLWEZI GENERAL HOSPITAL

I am a physiotherapist working at Solwezi General Hospital currently doing Msc Physiotherapy at University of the Western Cape. I am required by the university to conduct a research study as a requirement for a partial fulfillment of the Msc in physiotherapy. The title of the study is “**the perceptions of health care professionals regarding the role of physiotherapy in the management of upper limb fractures in children at solwezi general hospital**”.

Allow me to collect necessary information as per my study among doctors and physiotherapists working at the hospital and use the information for the completion of my study.

Please find attached a copy of my proposal and ethical clearance from the University.

Yours faithfully,


Louise Mubanga

APPENDIX 7



UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa
Tel: +27 21-959 2542 Fax: 27 21-959 1217
E-mail: louisemubanga@gmail.com

INFORMATION SHEET

Project Title: The perceptions of health care professionals regarding the role of physiotherapy in management of upper limb fractures in children in Solwezi, Zambia.

What is this study about?

This is a research project being conducted by Louise Mubanga a master's student at the University of the Western Cape. We are inviting you to participate in this research project because you are health professionals who handle children with upper limb fractures at Solwezi General Hospital. The purpose of this research project is to explore the perceptions of health care professionals regarding management of upper limb fractures in children. The study could enlighten physiotherapists regarding the role they could play in the management of children with upper limb fractures, assisting in the reduction of disabilities among these patients. In addition, all health care professionals managing children with upper limb fractures could see the importance of engaging in multidisciplinary rehabilitation. Furthermore, the results of the study could be a guiding source of information to the government/decision makers when enacting policies regarding the management of upper limb fractures in children in Zambia.

What will I be asked to do if I agree to participate?

You will be asked to participate in an interview at a time and venue that is convenient for you. The interview is about the perceptions of physiotherapists and doctors regarding their role in the management of upper limb fractures in children. The interview will be tape recorded after informed consent is obtained and should not take longer than 30-45 minutes. The participants have a right to withdraw from this a study at any time and have a right to ask for more clarification on the study.

Would my participation in this study be kept confidential?

The researcher undertakes to protect your identity and the nature of your contribution. To ensure your anonymity, your name will not be mentioned in this research. All participants will be given identification codes and tags that will be used to address participants during the discussions and also used on the consent forms and focus group confidentiality binding forms. The recordings will be stored in filing cabinets under lock which only the researcher will have access to. The identification codes will only be known by the researcher.

What are the risks of this research?

. There are minimal risks associated with participating in this study. In case of any issues arising from the questions asked in the interview, you will be referred for appropriate management of the problem.

What are the benefits of this research?

This research is not designed to help you personally, but the results may help the investigator learn more about management of upper limb fractures in children and how physiotherapists and doctors perceive their role in managing these fractures which may assist to reduce disability. We hope that in future other people might benefit from this study through the process of care and the collaboration of working as a multidisciplinary team.

Do I have to be in this research and may I stop participating at any time?

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. You will not be penalized or lose any benefits to which otherwise qualify.

What if I have questions?

This research is conducted by Louise Mubanga. Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Louise mubanga

Mobile: +260977337230

Email: louisemubanga@gmail.com

Should the hospital have any questions regarding this study and rights as a research participant or if wish to report any problems, may have experienced related to the study, please contact:

Head of Department,

Physiotherapy department,

Dean of the Faculty of Community and Health Sciences, University of the Western Cape, Private Bag X17

Bellville 7535

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee



UNIVERSITY OF THE WESTERN CAPE

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Tel: +27 21-959 2543 Fax: 27 21-959 1217
E-mail: mcoetzee@uwc.ac.za

CONSENT FORM

Title of Research Project: THE PERCEPTIONS OF HEALTH CARE PROFESSIONALS REGARDING THE ROLE OF PHYSIOTHERAPY IN MANAGEMENT OF UPPER LIMB FRACTURES IN CHILDREN

The study has been described to me in language that I understand. My questions about the study have been answered. I understand what my participation will involve and I agree to participate of my own choice and free will. I understand that my identity will not be disclosed to anyone. I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences or loss of benefits.

Participant's name.....

Participant's signature.....

Date.....

APPROVED

17 AUG 2015

ERES CONVERGE
P/BAG 125, LUSAKA.



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Tel: +27 21-959 2543, Fax: 27 21-959 1217

e-mail: louisemubanga@gmail.com

FOCUS GROUP CONFIDENTIALITY BINDING FORM

**Title of Research Project: THE PERCEPTIONS OF HEALTH CARE PROFESSIONALS
REGARDING THE ROLE OF PHYSIOTHERAPY IN
MANAGEMENT OF UPPER LIMB FRACTURES IN
CHILDREN**

The study has been described to me in language that I understand. My questions about the study have been answered. I understand what my participation will involve and I agree to participate of my own choice and free will. I understand that my identity will not be disclosed to anyone. I understand that I may withdraw from the study at any time without giving a reason and without fear of negative consequences or loss of benefits. I understand that confidentiality is dependent on participants' in the Focus Group maintaining confidentiality. I hereby agree to the following:

I agree to uphold the confidentiality of the discussions in the focus group by not disclosing the identity of other participants or any aspects of their contributions to members outside of the group.

Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

APPROVED

17 AUG 2015

ERES CONVERGE
P/BAG 125, LUSAKA

Participant's name.....

Participant's signature.....

Date.....

APPROVED

17 AUG 2015

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